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ABSTRACT

Eleven articles on various aspects of educational finance comprise this document, volume two of the NEFP series. Volume one of this series deals with educational needs, volume three with educational planning and finance, and volume four with the impact of educational finance programs. In general, the material in this volume treats education as a product--subject to the constraints of supply and demand. Each article explores a factor or sets of factors considered influential in determining the nature and types of future educational services. Discussed are (1) the relative roles of public and private financial support, (2) the influence of the economy on education, (3) the influence of the social milieu on education, (4) the investment nature of education, (5) the limits of taxation financing, and (6) the impact of educational objectives on educational development. Related documents are ED 036 007, EA 003 536, EA003 538, and EA 003 673. Funds for this research were provided by an ESEA Title V grant. (RA)

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Edited
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Johns - Goffman - Alexander - Stollar

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Economic Factors Affecting The Financing of Education

ED052514

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Preface

What will *really* be important in determining education output in the 1970's? That is the question which this collection of papers has attempted to explore. The process necessitated an examination of the total economic nature of education — its industrial structure and organization, its techniques of production, and its eventual products. Further, it called for an investigation, imaginatively presented by Kenneth Boulding in Chapter 1, into the determinants of the effective demand for education in the years ahead, a question which required some speculation over the "needs" and desires, as well as the willingness of the community to bear the costs.

Though not unique, education does exhibit enough special characteristics to warrant special analysis. Theodore Schultz recognized this more than a decade ago when he first began focusing attention upon the investment character of education. With the advent of the human capital concept, researchers have steadily applied to this resource many tools of analysis formerly restricted to physical capital. Perhaps most important, the human capital concept introduces a time dimension into the analysis and directs one toward an examination of the lifetime flow of income (or output) resulting from education. Such an approach provided the basis for regarding education as an investment with all the usual qualities of such an economic concept. Rate of return analysis, impact on productivity and incomes of particular groups, and effects on the nation's economic growth are some of the measures which result from the widespread adoption of this idea so closely linked with Professor Schultz. The papers included here by Professor

Schultz himself, as well as those of Thomas Ribich, Mary Jean Bowman, Selma Mushkin and William Pollak, and Henry Levin, more or less depend upon the nonconsumption characteristics of educational output.

But, however important it is to recognize the investment quality, it is just as vital to note that education is not just *another* investment good. Unlike most others, it provides benefits in the short and long runs to varying numbers of individuals over and beyond the income and other advantages enjoyed by the student himself. What economists refer to as "externalities" or spillovers, described by J. Ronnie Davis in Chapter 3, are responsible for much of the "economic" problem associated with the provision of this commodity and also eventually with the fiscal question. Because there are important effects upon the nonstudent—his family, community, and society—of varying quantities and types of education offered the student, these other beneficiaries must be given due consideration in the process of allocating resources to this industry. But the market simply cannot take these externalities into consideration and so some nonmarket institutional arrangements must be introduced, as indeed has been the case. In order to carry out the need for a collective decision as contrasted with the typical private decision, governments have become actively involved in decision-making in education, mainly as primary producers via the public school system. However, there has been much consideration given to various alternative institutional arrangements where the private sector is more involved in the actual delivery of the output. C. S. Benson discusses these alternatives extensively in Chapter 5 as do Mushkin and Pollack in Chapter 11, and, to some extent, Levin in Chapter 6.

But in the final analysis, whatever the production arrangement used, there is still the ultimate question of financing this output. Unless this is simply left completely to the private sector, thereby ignoring all those economic and social manifestations which make education somewhat different from most other goods and services, we will have to rely some upon the public purse. But whose purse? What level of government should provide the funds and on what basis should those funds be collected? Harvey Brazer in Chapter 8 and John Due in Chapter 10, respond to these questions. But what they suggest to be equitable and efficient must be tempered to reflect political reality. In Chapter 9 James Buchanan presents an extremely provocative essay on the current attitude of taxpayers, and focuses especially on the factors which may have had much to do with shaping these attitudes in the years ahead.

This volume does not present a simple solution to the problems of financing education. Economists, and especially those dealing with normative questions, are too independent and individualistic and creative to permit any simple generalization. The differences observed in this volume bear this out clearly. Yet in one sense it is only because these differences are so clearly in evidence here that the volume may be received as an important contribution. The controversies in public finance in general and in educational finance in particular are real and crucial. To move forward in this field we will have to resolve them, but to do so we will first have to recognize them.

Irving J. Goffman

Foreword

This is the second volume published by the National Educational Finance Project. The first volume was entitled *Dimensions of Educational Need.* The primary objective of the National Educational Finance Project is to develop improved plans for the financing of education. This at first may seem like a simple mission. But it involves researching such questions as the following: What will be the future demand for what types of education? For whom should education be provided? What effect will increased investment in education have on economic growth? To what extent can education be used to reduce poverty? What levels of government should participate in the financing of education and to what extent? How well are educational opportunities equalized among and within the states? What types of taxes are most equitable to use for the support of education? What will be the impact of these taxes on the economy? How equitable to both children and taxpayers are present state plans for the financing of education? What is the impact on education of federal funds now provided for school support? What criteria should be used to evaluate alternative models for the financing of education? These questions express only a few of the many issues and problems involved in the financing of education.

As the Central Staff for the Project explored these questions with the Project Committee and the Advisory Committee, it became apparent that a comprehensive study of the financing of education involved many economic factors. Therefore, the decision was made to explore in some depth the economic factors involved in the financing of education. An Advisory Committee on the Economics of Education was appointed by the Project Director. The following economists were appointed as members of that committee:

- James M. Buchanan, Professor of Economics, Virginia Polytechnic Institute
- Irving J. Goffman, Professor of Economics, University of Florida
- Selma Mushkin, Professor of Economics, Georgetown University
- Thomas O. Ribich, Associate Professor of Economics, University of North Carolina

The Advisory Committee on the Economics of Education met in Washington on January 23, 1970, and developed the chapter outline for this publication. The Committee also suggested the names of economists to write the different chapters of the publication. Professor Gary S. Becker of Columbia University assisted in further refining the outline of the study. The Project Director then contacted the recommended economists and was successful in obtaining the services of twelve outstanding economists to produce this book. Each author was requested to furnish an outline of his chapter to the other authors in order to avoid undesirable duplication among chapters. Each author is solely responsible for the content of his chapter. Editing was confined to such matters as correcting typographical errors, style of headings, style of references, improvement of syntax and similar matters.

No attempt was made to obtain a consensus on controversial matters among the several authors nor between the authors and the Central Project Staff or the Project Committee. It is believed that considerable information of value is suppressed when a consensus is required on any policy recommended or advocated. For example, some members of the Central Staff of the National Educational Finance Project are opposed to the "voucher plans" which provide public funds for private and sectarian schools. To date, the limited appraisals of such schemes of finance tend to ignore the staggering possibilities of creating an educational caste system whereby children would be segregated socially, economically, culturally, religiously and racially. But the staff believes that decision-makers of financial policies for education should have access to all alternatives, both good and bad. Therefore, descriptions of different types of voucher plans were not deleted by the editors of this book.

The economists who produced this book are all distinguished scholars and what each has to say should be given careful consideration despite the fact that these economists do not necessarily agree with one another nor with the Central Staff of the Project on all points.

Roe L. Johns
Kern Alexander

CHAPTER 1

Factors Affecting The Future Demand For Education

KENNETH E. BOULDING

Economic factors are those which concern the way in which society is organized by exchange and by the transfer of "exchangeables" or commodities. There are a number of commodities, however, which may be called "peculiar" because they are produced, bought, sold, and consumed in a very complex sociological matrix. Labor is one such peculiar commodity and a good deal of rhetoric has been devoted by the labor movement to demonstrate that labor is not a commodity. Nevertheless it is bought and sold and it has a price. Thus it has all the properties of a commodity. But it has other properties besides, which make it peculiar.

Education similarly is a peculiar commodity. It is bought and sold and has something like a price. There is a segment of the economy which can be thought of as the educational industry. In the United States, for instance, Machlup estimated that as of about 1958 the total knowledge industry occupied almost thirty percent of the economy.[1] What we think of as the educational industry, that is schools, colleges, universities, and organizations for formal education, public and private, occupies approximately 7 percent of the gross national product and this proportion is rising very steadily. Formal education is now an "industry" which occupies a larger proportion of total economic activity in the United States than agriculture.

CONCEPTS OF SUPPLY AND DEMAND APPLIED TO EDUCATION

If education is a commodity and schools are an industry, it should be useful for us to ask ourselves how far the economist's concepts of demand and supply can be applied to it, and how far changes in both the price and quantity of education can be interpreted in terms of movements of demand and supply.

Relationship of Price and Quantity to Demand

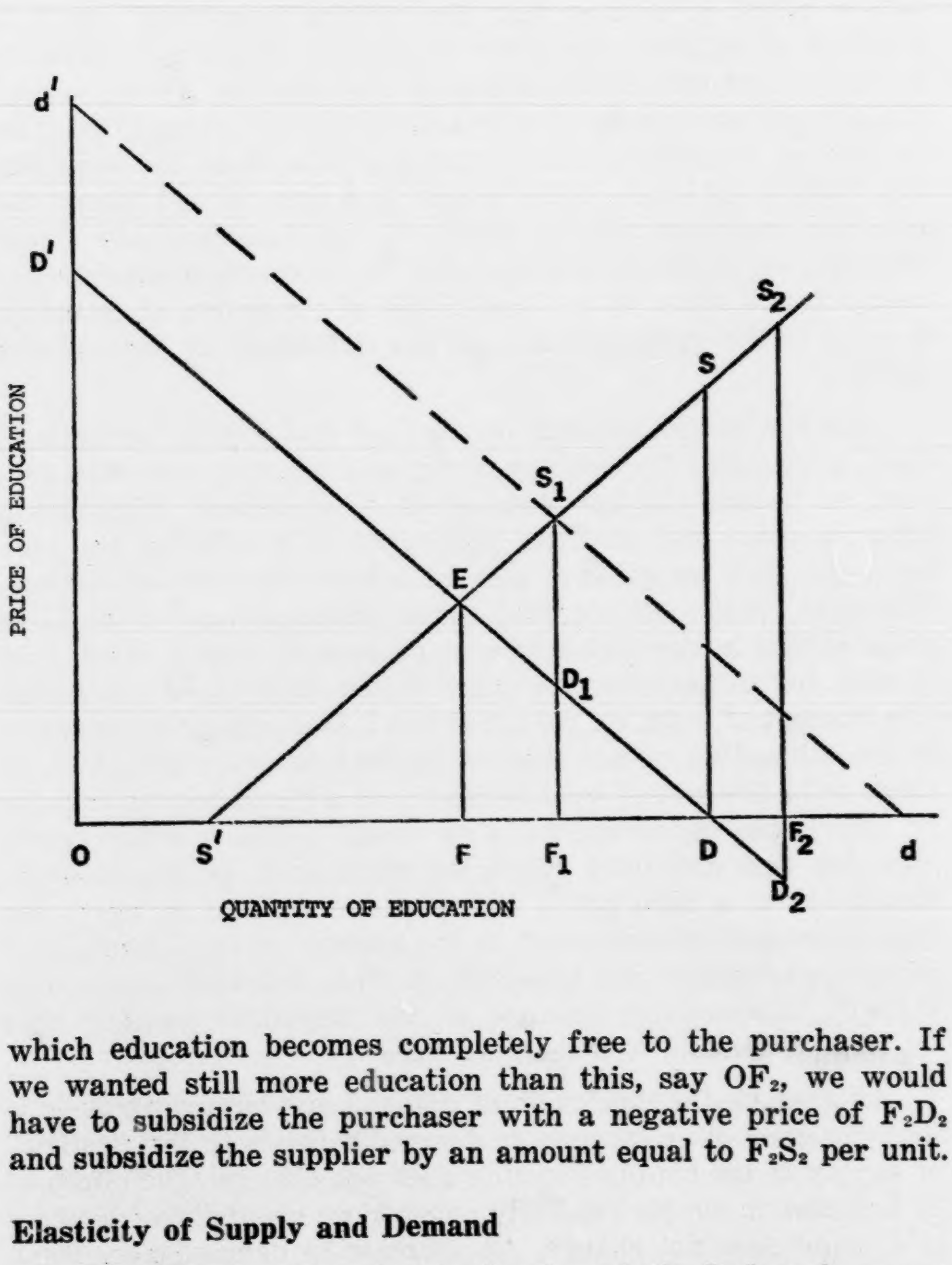
What the economist means by demand is a functional relationship between the price of a commodity and the quantity which will be purchased. Similarly, supply is a functional relationship between the price and the quantity which will be offered for sale. This is illustrated in Figure 1-1. Here we plot the quantity of education horizontally and the price of education vertically. We postulate a supply curve S'S. This has been drawn with a positive slope indicating that in order to have an increase in quantity of education, we have to pay a higher price for it. The demand curve D'D is drawn with a negative slope indicating that the lower the price of education the more of it will be purchased. If education were left entirely to the market there would be an equilibrium at E, with a quantity of education OF both supplied and demanded at a price FE. We do not have to assume of course that the functions are linear; they are merely drawn as straight lines in the diagram for convenience.

Relationship of Subsidies to Quantity of Education

Suppose now that the society decides that the quantity of education which would be forthcoming under a completely free market is not sufficient. There may be all sorts of reasons for this decision which we will look at later. Suppose that it is decided that the ideal quantity of education is OF_1; then in order to persuade people to purchase this amount the price would have to be F_1D_1. But in order to persuade people to supply this amount the price to the supplier would have to be F_1S_1. The difference, D_1S_1, is a subsidy per unit of education which would have to be given in order to achieve that expansion of the quantity of education from OF to OF_1. If we wanted to expand the quantity of education to OD the price would have to be zero and the subsidy equal to DS. That is the point at

Fig. 1-1

PRICE AND QUANTITY OF EDUCATION



which education becomes completely free to the purchaser. If we wanted still more education than this, say OF_2, we would have to subsidize the purchaser with a negative price of F_2D_2 and subsidize the supplier by an amount equal to F_2S_2 per unit.

Elasticity of Supply and Demand

The discussion above is a textbook analysis. It does, however, point to one important characteristic of the system, that is, the importance of the elasticity of the supply and demand curves. The absolute elasticity is the slope of the curves, or the ratio of the change in quantity to the change in price. If supply or demand is inelastic, this means that a change in price produces only a small change in quantity, and the curves in Figure 1 will be steep. It is clear that the amount of subsidy which is required to achieve any given expansion of quantity depends mainly on the elasticities of supply and demand. If the supply and demand are inelastic so that it takes large changes in price to produce a given change in the quantity, then the subsidies also have to be large. If the supply and demand are elastic the subsidies required will be small. If the functions are linear then the elasticity of subsidy, that is, how much subsidy per unit must be given to produce a unit of expansion of quantity, is equal to the arithmetic sum of the elasticities of demand and supply.

Another useful product of demand and supply analysis is that it separates the concept of demand sharply from the concept of "need." If the demand is a functional relationship between price and quantity purchased it is affected not only by desire and income but also by alternative uses of income. The main reason why demand curves generally have a negative slope is that a high price for one commodity makes the use of income for expenditure on other things look more attractive. The concept of need, on the other hand, is a concept of administrative allocation rather than of market or price allocation. It tends to be thought of in absolute terms without regard to price or alternative opportunities. We could perhaps define need, although this definition might be questioned, as the quantity demanded at a zero price, this representing, as it were, the maximum amount demanded in the absence of consideration of other opportunities and alternatives. This definition however is possibly unacceptable because of the linguistic paradox that we always demand less than we need!

Another useful conclusion of demand and supply analysis is that the effect of an increase in demand depends on the elasticity of supply if the supply function does not change. The effect of an increase in supply similarly depends on elasticity of demand if demand does not change. An increase in demand may mean that the quantity purchased will be larger at each price. That is, it represents a shift to the right in the demand curve. Thus, a rise in the demand for education would be represented by a shift of the demand curve from, say, D'D to d'd, with the equilibrium position moving from E to S_1, with a higher price F_1S_1, and also a higher quantity OF_1. The steeper (more inelastic) the supply curve, the greater will be the rise in the price and the smaller the rise in the quantity for any given change in the demand. As we have been facing a sharp rise in the demand for education in the United States, and indeed in the whole world, the question of the elasticity of supply of education is by no means irrelevant.

Quantity of Education and Price

Supply and demand analysis does give us some qualitative insights into the possible dynamics of any industry or segment of the economy and does enable us to ask some questions which perhaps we may not otherwise have considered. Education however, as a segment of the economy exhibits so many peculiarities that an interpretation of the demand and supply analysis is by no means easy and its results must be interpreted with great care. The first problem is that of the measurement both of the quantity of the education and of its price. These two problems are very closely related, because the price, P, multiplied by the quantity, Q, of any commodity is equal to the total revenue, E, derived from its sale, that is, $E = PQ$. It is fairly easy to get a dollar figure for the total amount E that is spent on education. What is not so easy is to divide this into a price component and a quantity component. Does the rise in the proportion of the economy which is going to education, for instance, represent an increasing quantity of education or merely an increase in its price relative to other things? We can deflate the total dollar revenue of the education industry by some price index to take care of inflation. Even after we have done that, however, the question then arises how much of the real increase is due to price and how much is due to quantity? These are not two questions but one, for if we can define the quantity we will also be able to define the price, which is simply the ratio of the total revenue to the quantity: $P = \frac{E}{Q}$.

Any attempt to measure the quantity of education produced forces us back almost embarrassingly on the question of what is the product of the educational industry? Ideally the answer to this question is that education produces a product known as knowledge, which is some kind of restructuring within the human nervous system to produce revised images of the world which are better "maps" of the real world itself. It is odd that we have no word in English to describe "false knowledge," that is a map of reality within the human nervous system which does not correspond to the world outside. Nevertheless it is clearly the business of education to produce true knowledge rather than false knowledge, though we now run into an old philosophical dilemma about how we know that our own or anybody else's knowledge is true. One answer to this question is that we can neither perceive nor measure the truth, or the complexity, of the knowledge structure directly, but that we can detect an *error*, either in our own or in somebody else's knowledge structure. We do this by observing a very specific form of behavior, that is, making predictions by stating an image of the future, and then testing these predictions by observing the future when it becomes the present. Predictions which are falsified produce a "mismatch signal" which, if a rather complicated set of conditions are fulfilled, will correct the knowledge structure, and so move it in the direction of a more accurate map of reality.

The product of education, furthermore, is not merely true knowledge but valuable true knowledge, valuable, that is, to the knower and to the society in which he is embedded. True knowledge about how to find a post office is more valuable to most people than true knowledge about the configuration of the back side of the moon, though to an astronaut who is about to land on the back side of the moon true knowledge about its configuration may be very valuable indeed. In order to measure the quantity of education, therefore, we would have to know not only the amount of true knowledge which has been produced by it in human nervous systems, but we would also have to multiply each item of true knowledge by "shadow price" or evaluation coefficient in order to calculate the aggregate significance of new knowledge.

Part of the difficulty of viewing education as an industry is that to the learner, a very large part of the value of new knowledge, acquired in formal education and in the classroom, arises from its usefulness in passing examinations. Thus the very device which is used to test the value of new knowledge also creates that value. This is a little bit like the problem we face with some commodities, where the evaluation of the commodity itself is a function of its high price. Diamonds are valuable because they are valuable and for no other very good reason. One recalls the old story of the grocer who divides a virtually homogeneous box of tea into three parts, one of which he sells at a low price to the poor, another at a moderate price to the middle class, and another at a high price to the rich, everybody being satisfied that the price he has paid reflects the quality of the tea. One suspects that education is rather similar and that the high reputations and high incomes which are derived from better quality institutions are a function not of the knowledge acquired in these institutions but of the reputation acquired in them.

Here we start out with an innocent question of defining the quantity of education, and we seem to be hovering on a huge morass known as human learning theory. Nevertheless, there is no escape from this. The product of education is the process of learning: that is, the growth of knowledge, and, more than that, the growth of valuable knowledge, the measurement of which presents great difficulties, particularly in the absence of any very good theory of how human beings learn anything at all. It is not surprising, therefore, that the education industry has turned to surrogate measures of the quality of education which, it is hoped, at least bear a moderately linear relationship to the thing we are really trying to measure. An obvious surrogate measure of this kind is time spent in being educated, such as hours of classroom attendance or years of schooling. Knowledge gained, it is hoped, is linearly related to the application of the seat of the pants to the seat of the classroom chair. The defects of this measure are all too easy to state. What many children learn in the classroom is knowledge which, no matter what its truth, has a highly negative value, that is, that they are no good, that they always make mistakes, that they cannot speak good English or do algebra and that they are condemned to the lower class for life. Other children, by contrast, especially those in the more prestigious schools, learn that they are somebody, that they can succeed in almost anything that they really want to apply themselves to, and that if they fail it is because they have chosen to fail rather than because they are failures. Knowledge about personal identity, to which, of course, the whole knowledge industry contributes, is peculiarly significant in formal education. It has a high value either positive or negative for the student and it very rarely gets in any direct way into examination results, accrediting decisions, or even into planned program budgeting systems.

As long as there is any positive correlation, however, between the measure that we are using and the thing that we are trying to measure, I suppose we can say that a bad measure is better than no measure at all. Thus the quantity of education as measured by time spent may be for most students, though not for all, better than nothing. It is the nagging feeling we have that, for some students, classroom hours are negatively correlated with the value of the knowledge acquired that makes us uneasy, but we can hope that these cases are a small minority.

Education and Feedback from Consumer

A further problem of the demand for education, which arises also because of the extreme difficulty of measuring its quantity, is that the demand is made for the most part on behalf of others. All demands are subjective. If I have a demand for tea, it is simply because the consumption of tea gives me some sort of subjective satisfaction, but at least it is my satisfaction. If I buy a tea the flavor of which I do not like, I very soon find this out; there is very rapid feedback in the system and I do not buy that particular kind of tea again. In the case of ordinary commodities, therefore, the market provides a reasonably adequate process for learning about exchange opportunities by the making and testing of predictions, and it provides quite rapid feedback from "purchase error," especially in the case of commodities with a short length of life. The longer the length of life of the commodity, the harder it is to detect purchase error and the less satisfactory the feedback from experience. Though it is easy to learn that one does not buy some particular brand of tea, it is much harder to learn that a particular kind of automobile is a lemon. When purchases are made on behalf of others, the error detecting process of mismatch and feedback is still further eroded. Wedding presents are a notorious case in point where the experience of the recipient is rarely fed back to the giver.

Education is a commodity which suffers from almost every conceivable handicap when it comes to the correction of error and the evaluation of results. Its product has a very long life. All the wrong things we learned in school usually stay with us the rest of our lives. The product of formal education has a life expectancy of some sixty years. Almost the only other commodity with this length of life is housing. It is perhaps no accident that the housing industry, like the educational industry, is notoriously unprogressive, is subject to rather meaningless changes of fashion, and produces an output which seems remarkably difficult to improve. But even houses are frequently bought by the people who live in them, though it is rather rare for them to produce any feedback to the architect about his mistakes. Education, however, is mainly purchased for children and students either by their parents, the church, or the state or some other agency which is acting on their behalf. Under these circumstances the feedback, especially unfavorable evaluations from the student, is regarded as a mark of ingratitude, is discouraged, and very rarely results in much of a learning process on the part of those who pay for the education. Here then is the ultimate paradox that the knowledge industry is precisely the one in which it is hardest to learn anything about success or failure.

Measuring the Educational Product

It is not surprising that under these circumstances the educational industry is remarkably subject to fads and fashions. It is extremely hard to measure the product where the act of measurement of the product distorts it, and the product is enjoyed (or not) by people who do not pay for it. It is not surprising that the practitioners of the industry spend a great deal of time in developing "objectives." Education indeed is almost the only industry in which the measure of success is the achievement of an imaginary product. Schools of education spend a great deal of time inculcating school teachers with the necessity for stating objectives and then measuring their achievement by achieving them. Under the impact of behaviorism, of course, we abandon the notion that anything could be known about knowledge, hence we now go in for "behavioral objectives" on a theory, derived mainly from rat psychology, that learning can only be measured by change in behavior. As long as we include linguistic behavior, treating students as if they were rats is not so dangerous. I am not arguing that the thinking about behavioral objectives is worthless. It can easily, however, become ritual, and there is bound to be a strong tendency for teachers to define as objectives the changes in behavior in the student which they think they can achieve. Here is a wonderful example of the self-fulfilling prophecy in which mismatch signals are utilized to change the information input rather than to change the image of the world.

The Grants Economy and the Exchange Economy

The unfortunate but unavoidable fact that those who pay for education are not usually the ones who receive it, except in the somewhat quantitively minor case of adult education, is reflected also in the fact that the educational industry derives its revenue to a very large extent from the "grants economy." The total economic system can conveniently be divided into two parts. One is the exchange economy which is organized by two-way transfers, in which A gives B something and B gives A something. The other is the grants economy which is organized by one-way transfers, in which A gives B something which is exchangeable but B does not give A anything that is exchangeable, even though he may give A certain psychological satisfactions that are not strictly, however, part of the economy.

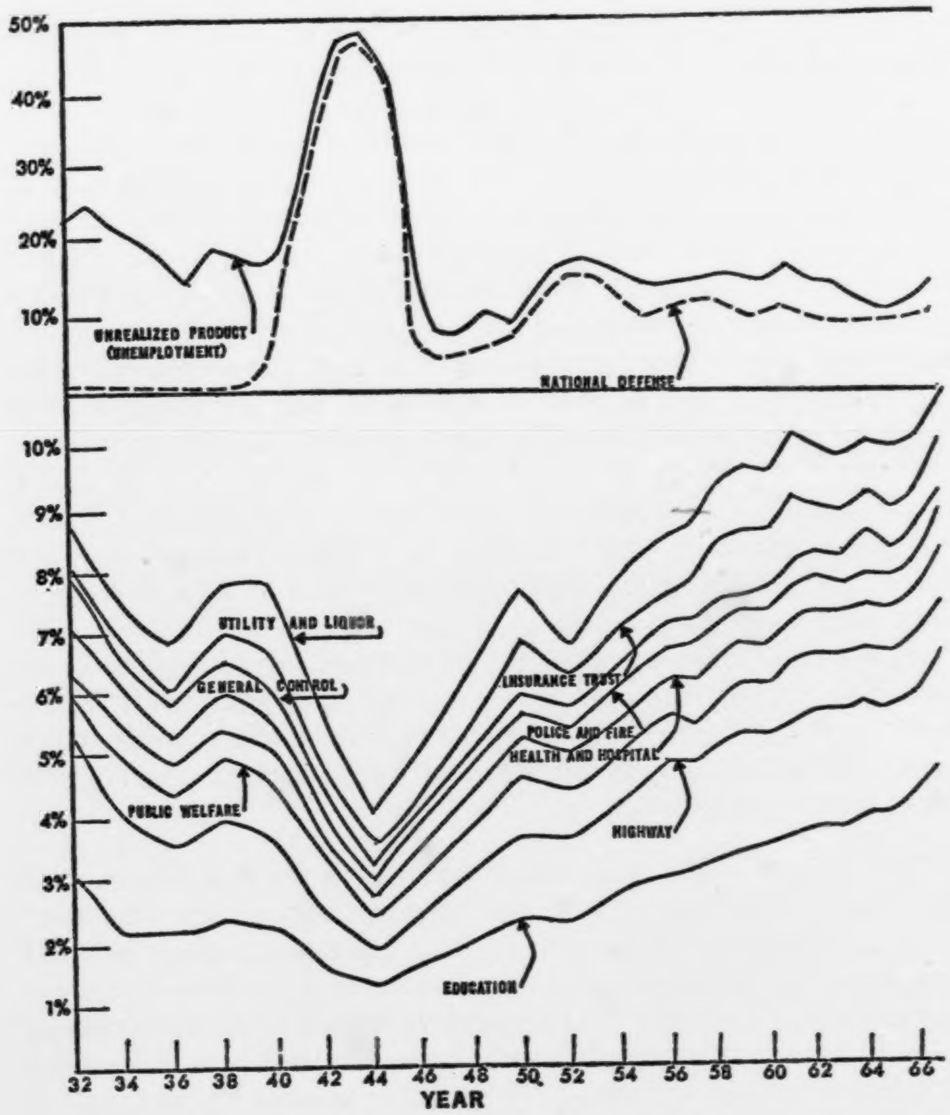
Grants are motivated by two principle motivators — benevolence and fear. If A gives a grant and receives nothing tangible in return, this may be, in the first place because A feels benevolent towards B. Benevolence means in technical economic language that the perception of utilities is interdependent; that is, if A perceives that B's welfare is increased, A's welfare is increased by this perception. Benevolence, of course, can be negative, in which case it becomes malevolence. Selfishness or indifference is simply the zero point on the scale of malevolence and benevolence, in which A's perception of a change in B's welfare makes no change in A's evaluation of his own welfare. This, in fact, is rather a rare case. Most relationships have at least a small amount of malevolence or benevolence. A's benevolence towards B may be measured by his *rate of benevolence*, that is, the amount A will sacrifice in order to perceive that B is better off by a dollar. If A's rate of benevolence is anything above .5, and if A by giving B a dollar perceives B to be better off by two dollars, then it is quite rational for A to make a grant of one dollar to B.

There is, we must recognize, a second source of grants. If B threatens A, A may make him a grant in order to prevent him from carrying out the threat. This is *tribute*. It is not always easy to tell in practice where benevolence ends and tribute begins. Grants given for education, whether by parents of the children, which are in the private grants economy, or by the state indirectly to children and students through the state supported schools, in the public grants economy, are mainly the result of benevolence, although the threat of having children around the house all day may not be wholly insignificant in persuading parents to vote for school taxes. The fact that the revenue of the education industry arises mainly in the grants economy introduces some peculiarities which are not found in commodities sold in the exchange economy. The elasticity of demand for a commodity in the exchange economy depends mainly on its substitutability with alternative sources of obtaining similar satisfactions. A rise in the price of a commodity in the exchange economy will usually diminish its purchase mainly because other uses of income for purchase look more attractive. The extent to which the purchase declines depends on whether attractive substitutes can easily be found, assuming the prices of other things to be unchanged. In the grants economy a grant for one purpose competes much more with grants for other purposes than it does for commodities in general. Grants are a part of the total flow of expenditures which in some ways forms an "economy" of its own insofar as the total of grants is the result of the general level of the sense of community or benevolence, so that an increase in a grant for one purpose is likely to lead to a diminution in another grant rather than in the diminution of a purchase in exchange. Thus, the total sum of grants is likely to be more stable than any particular component of it. *The demand for education therefore is likely to depend more on what is happening in other parts of the grants economy*, for instance to other government expenditures, than it is on what is happening to income and expenditures in general.

We do not really know how far this is true in the case of the family. Does the family, for instance, regard the education of its children in private schools as competitive with a new car and other items of conspicuous consumption or does it regard payments for education as competitive with donations to charity or with taxes? A study of family budget response to the surtax of 1968 would be extremely instructive in this regard, yet as far as I know this has not been done. There is a good deal of evidence that expenditure on education is highly vulnerable to major changes in national defense. It is also vulnerable to severe depression. This is shown in Figure 1-2. Here we take the Gross Capacity Product as a measure of the total size of the economy, the Gross Capacity Product being roughly what the gross national product would have been had there not been

Fig. 1-2

COMPONENTS OF STATE AND LOCAL GOVERNMENT EXPENDITURE
AND
NATIONAL DEFENSE AS A PERCENTAGE OF GROSS CAPACITY PRODUCT



any unemployment. The bottom part of the diagram then shows the various components of state and local expenditure as a percentage of the Gross Capacity Product. The upper part of the diagram shows the proportion of the economy devoted to national defense on the one hand and to what is called unrealized product on the other. Unrealized product is actually equivalent to the proportion of the labor force unemployed, as we have calculated the Gross Capacity Product. The impact made on both local government in general and education in particular by both the depression and the Second World War is very striking. Equally striking, however, is the resilience of education in the face of a large and permanent increase in the proportion of the economy devoted to national defense.

Changes in the Productivity of the Educational Industry

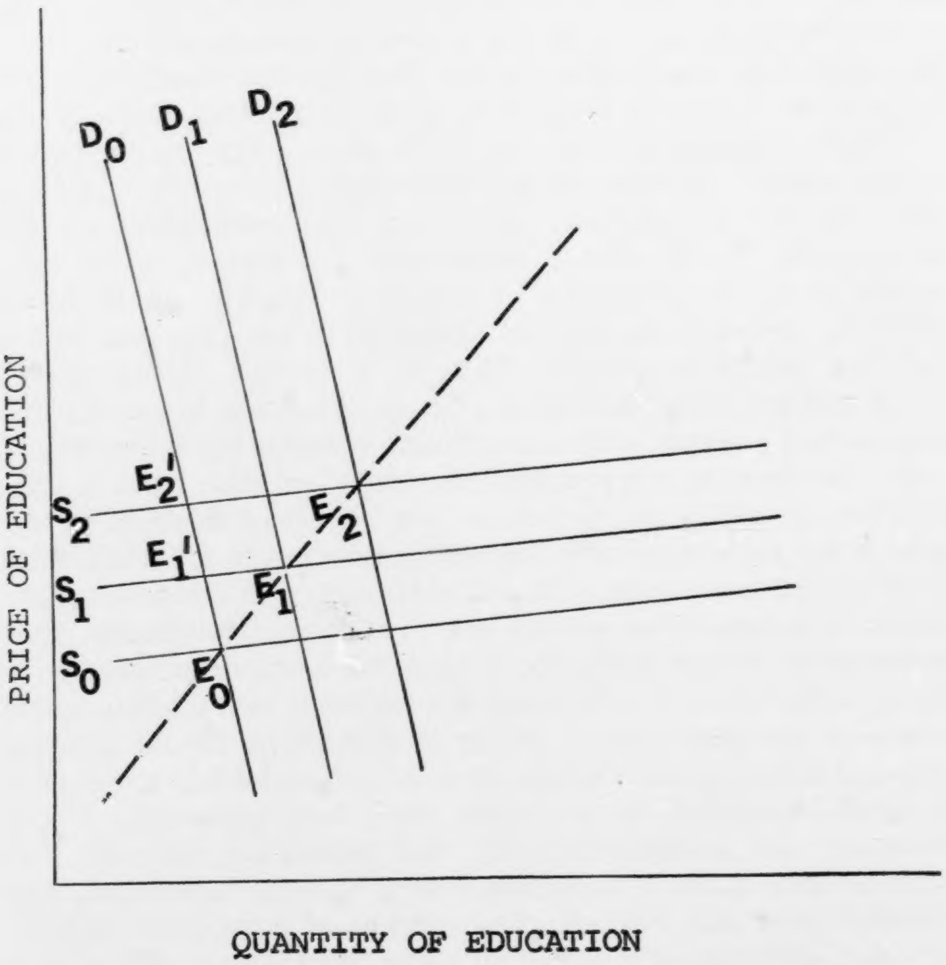
One final point which is relevant to the consideration of the demand and supply of education is that education is still very largely a "craft" industry, the methods of which have not been much touched by the scientific revolution, at least by comparison with an industry such as agriculture. Average productivity in agriculture has increased almost twenty times in the last hundred years. The technology of teaching is still not very different from what it was in the days of Plato. This is particularly true in the universities; in grade schools and high schools unquestionably there is a greater variety and much more use is made of educational tools such as movies, film strips, and other visual aids and there is even a small move into computer-assisted instruction. It is still very doubtful, though, whether much more knowledge-value is being produced per hour of teacher time or per real dollar of total expense than it was a hundred years ago, or even twenty-five hundred years ago. There are very good reasons for this "backwardness" of the educational industry. Its basic field of operation, the human nervous system, is a system of such fantastic complexity that scientific knowledge about it proceeds very slowly and only encompasses a minute fraction of the total system. We know something, by "folk knowledge," about the process by which teaching results in learning, and we must have been doing something right — otherwise we would never have been able to transmit the knowledge stock of mankind to successive generations for thousands of years as we have done. Nevertheless we really do not know *what* we are doing right and we certainly do not know very much about how to do it better. Even the doubling of the efficiency of the educational industry in terms of the knowledge produced per real dollar spent would seem quite beyond our capacity at the moment.

What this means is that the price of education, relative to those commodities being produced under conditions of rapidly increasing productivity, is bound to rise, simply because the relative price structure is so largely a function of relative productivities. Teachers' salaries have to rise at least roughly in proportion to the general rise in incomes and teachers' productivity does not rise in anything like the same proportion. What we have in education, therefore, is not so much an inelastic supply curve, for under given conditions of productivity it is probably not difficult to attract resources into education by a relatively small increase in real incomes obtained from it. What is happening is that the whole supply curve is moving upward and to the right as costs rise. The demand is also probably rising with increased incomes, partly because education is something of a "superior good" which we can afford more of as society gets richer and partly also because with the increase in the stock of knowledge a larger effort is required to transmit it. What we have therefore is something like Figure 1-3. S_0, S_1, S_2 show successive positions of the supply curve of education in successive years, and D_0, D_1, D_2, positions of the corresponding demand curve in these years. The position of equilibrium rises from E_0 to E_1 to E_2 with both the price and quantity of education rising as time goes on. The less the demand rises, of course, the smaller will be the rise in both the price and the quantity. If demand did not rise at all in the face of this increasing real cost we might find the price of education rising and the quantity actually falling as time went on, following the path E_0, E_1', E_2'.

Demand for Different Kinds of Education

Up to now we have assumed implicitly that education was a homogeneous commodity. In practice we know education to be a very heterogeneous commodity indeed. It is not only that the industry is divided into public and private schools, into secular and religious schools, into Catholic, Lutheran, and others, but also that education is divided into vocational and technical edu-

Fig. 1-3



cation of a large number of different kinds as well as general education, also of a number of different kinds. The demand for each of these different kinds of education is different, although all these demands are likely to be related. The demand for private schools, for instance, is going to be related to the quality and cost of the public schools. The dynamic patterns of the interrelationships may be of great importance. We are all familiar with the problem faced by a public school system once it deteriorates to a point where wealthier parents are willing to send their children to private schools and then are unwilling to vote for adequate school taxes. We may find the same phenomenon in communities with strong religious groups where a large private grants economy goes into the parochial schools and therefore the community is unwilling to tax itself for the benefit of public schools which a large proportion of the population does not use.

Some economists, such as E. G. West,[2] have made rather cogent arguments that the existing system of public education prevents the development of variety and competition in the educational industry. They recommend a system by which education would be subsidized by means of vouchers given to all children, and exchangeable for education at any approved school whether public or private. This, it is argued, would permit much greater experimentation and specialization in schools and also permit parents with a particular concern for education of their children to supplement the state subsidy, that is the voucher, by additional payments. The impact of schemes of this kind is not easy to predict. One of the arguments for uniformity in education is, of course, that it is necessary to create a society which is homogeneous enough not to fall apart politically. This presumably is one rationale behind the current pressure for racial integration in education. Educational segregation would create a two-part society which is repugnant to our present sense of social justice and our demand for societal homogeneity. It could be argued, on the other hand, that uniformity is not necessary for political stability, and indeed an enforced uniformity may produce a society which is dull, conformist, and without color and interest. The concept of a "mosaic society" of many different subcultures all living together at peace within some political framework has a great attractiveness as we move towards a world in which the great period of human expansion is over.

Life Experience and Demand for Education

These are very fundamental questions for educational philosophy and are well beyond the scope of supply and demand analysis. But it is important to recognize that they do underlie the apparent simplicities of supply and demand and that we should not be deluded by these simplicities into forgetting that the real world is enormously complex and multivariate. When we introduce the fact that both the demand and supply of education are a result of a long and continuous process of social learning, the situation gets even more complex. The demand for education arises not from its recipients, as we have seen, but from those adult members of society whose decisions determine the supply of funds. Their demand depends in no small measure on the childhood and indeed the total life experience of these same people. People who were deprived of education in their youth and who observed other people benefiting from it are likely to have a very strong demand for education for their own children. People who received education gratuitiously and who perhaps took it for granted may not have the same motivation when it comes to making personal sacrifices for the education of their own children. I have heard the observation that the current increasing unwillingness of state legislatures to allocate funds, especially to higher education, as compared to a generation or two ago, is related to the fact that many state legislators, say at the beginning of this century, had not been to college and hence had rather romantic ideas about it and wanted very much to have their children enjoy the privileges of which they had been denied. Today most state legislators have been to college and do not have the same romantic illusions about it; hence they are less willing to make sacrifices for their children than their fathers and grandfathers were. These are learning processes of great complexity. We cannot do much more than note that they exist.

OTHER FACTORS AFFECTING THE DEMAND FOR EDUCATION

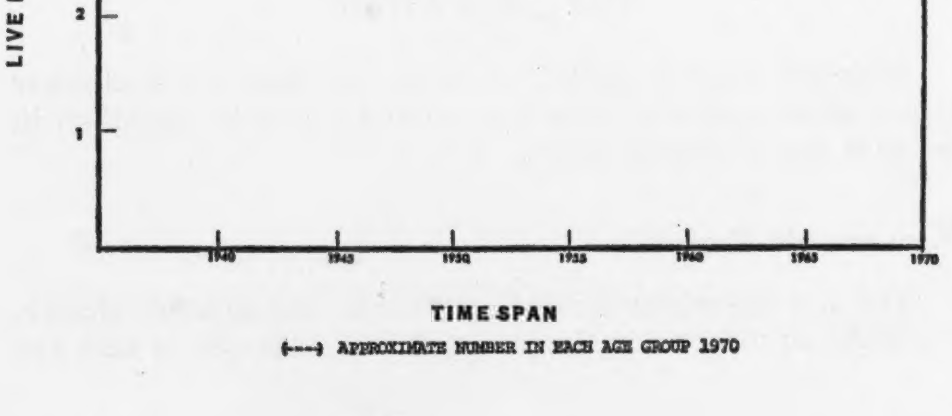
With this analysis behind us, let us now take a look at other forces which may affect the demand and supply of education in the next ten or twenty years.

Demographic Factors

The first important factor is, of course, demographic change, especially as reflected in the total numbers of people in each age group in different years. Demographic change is dominated by the principle that anyone who is X years old today will be X + 1 years old this time next year if he is not dead. Consequently, if we have a fair idea of the survival distribution of each cohort, that is, the proportion of all those born in a given year who will die each subsequent year, then we can take the number of births in a given year and follow the cohort through until it finally disappears. Thus in Figure 4 we show the total number of births in the United States from 1940-69. The "bulge" from 1945 to the 1960s is very apparent. It is equally apparent that the bulge is now over. The peak of total births in the United States was 1957, and this cohort is likely to be the largest age group for a good many years to come. The dotted lines show approximately the survival function from each cohort, excluding immigration, so that in 1970, for instance, A shows the number of three year olds, B the number of four year olds, C the number of five year olds, and so on. The top of the bulge is now passing through the high schools. Obstetric wards and kindergartens are beginning to empty and lower grades are declining rapidly. Between the ages of five and fourteen we can

Figure 1-4

LIVE BIRTHS IN THE UNITED STATES FROM 1940–1965



assume that the proportion of each age group that is in school is very high and is not likely to change much. As we move into the later years of high school, dropouts become important and in college, of course, the proportion of the age group actually attending school is less than 50 percent. At this level changes in the proportion attending school may be as important as the number in each age group. One thing that is certain is that the pressure on the American educational system, which has been intense in the last ten years, will continue to diminish as we move into the future. The 4.3 million babies of 1957 who are now teen-agers will be replaced by only 3.4 million babies in 1969 as teen-agers by 1982. Insofar as the "youth problem" in the United States has been the result of the "bulge" and the unusual numbers of young people, we may expect this problem to diminish in the future. It is hard to say how much is due to the bulge and how much is due to long-run forces in our society resulting, for instance, from the unprecedented segregation of teen-agers in high schools and of young adults in colleges. But we may certainly expect to see amelioration of the unemployment problem among young people simply because labor markets are somewhat age-specific. The high unemployment among young people in the last ten years has reflected in part the very large numbers of them. As the proportion of young people declines, it should be much easier for those who wish to do so to obtain employment.

The implication of the current demographic situation for the colleges is extremely complex. Even if there is no change in the proportion of each age group entering college, freshmen enrollment should increase at least up until about 1974 or 1975. The increase will not be large, and may soon be followed by a substantial decline. There are already signs of severe oversupply of college teachers, especially Ph.D.'s in fields like philosophy, languages, the humanities, and even physics. This is likely to lead to a reduction in graduate school enrollments and thus further reduction in the demand for college teachers. It will not be surprising, therefore, to find an increased number of Ph.D.'s teaching in junior colleges or in high schools. It is a moot point of course, as to whether the conventional Ph.D. is particularly good training for this kind of teaching and it may well be that some retraining programs will be necessary.

One very curious consequence of the "bulge" which may have some implications for the educational system is that there is now a severe deficiency in marriageable males. The groom in the United States averages two or three years older than the bride. The large cohort of girls in 1947 is going to try to marry the small cohort of men of 1944 or 1945; the deficiency may be as much as half a million. It is not perhaps surprising therefore, than an unusual amount of unrest has appeared among women as reflected in the various women's liberation groups. As the unmarried famale is an important labor market source for the educational industry, the next few years may see an unusual number of women entering the teaching profession.

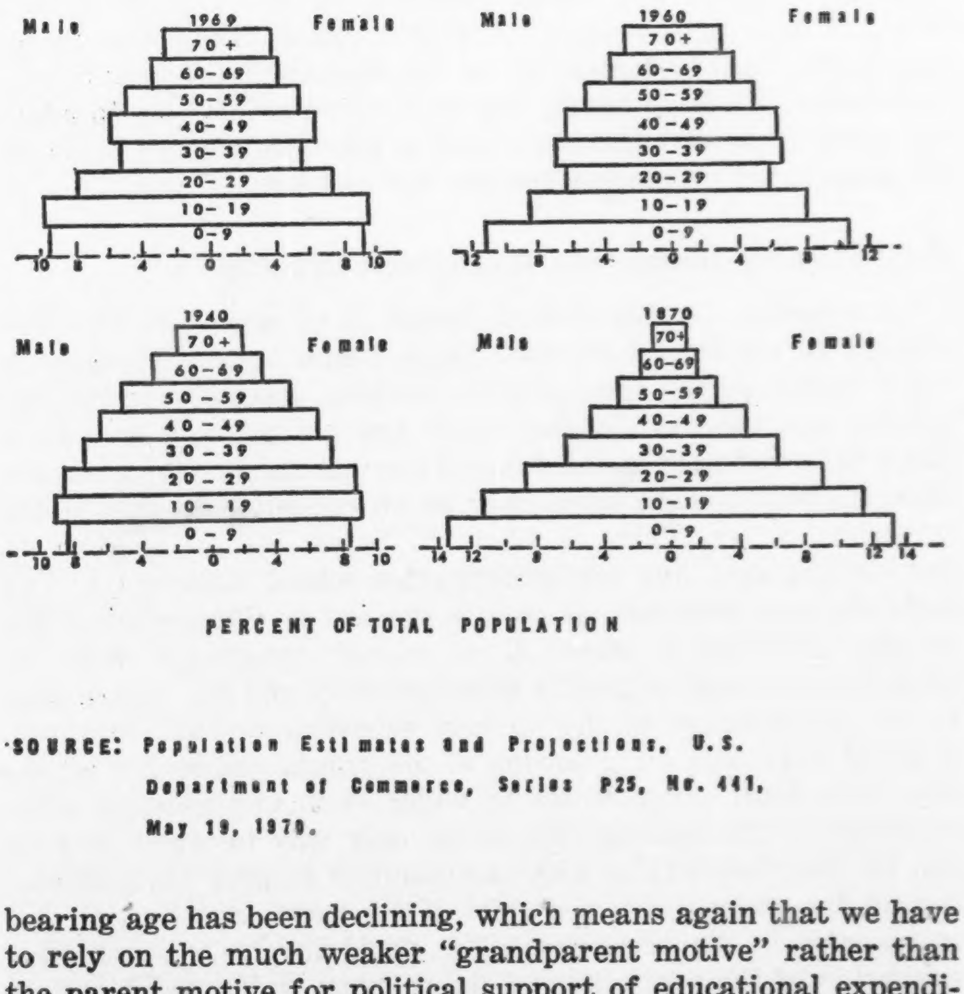
We have not ventured to predict with any certainty the number of births in the future, as it is extremely dangerous to predict linear trends in the birth rate. We would not go very far wrong in assuming that all population predictions are wrong. Even if fertility continues to decline, the "bulge" will begin to marry and presumably have children, so that even with declining fertility (that is, a decline in the number of children per thousand women of childbearing age) we may still have a rise in the total number of births in the next few years. However, in light of the general anxieties about the future and the population-ecology syndrome, it would be somewhat surprising if births increased very sharply. How close we now are to stabilizing the population of the United States may be brought out by reflecting that a stable population of 210 million where the average age of death is 70 would have 3 million births a year. If we achieve this, it would mean that no further expansion of the educational system would be necessary as far as number of students is concerned, at least up to the middle of high school, simply because we are so close to 100 percent of each age group in school now.

Demographic Changes in Older Age Groups

Demographic changes in the older age groups are also of great importance in assessing the demand for education, as it is these age groups that ultimately make the decisions. There is a long-run shift in the overall age distribution from the "triangle" of earlier times to the "rectangle" which we are so rapidly approaching, which has about equal numbers in each age group. The change from 1870 to 1909 is shown dramatically in Figure 5. This means that the proportion of voters of child-

Fig. 1-5

DISTRIBUTION OF THE POPULATION,
BY AGE AND SEX:
1870—1969



·SOURCE: Population Estimates and Projections, U.S.
Department of Commerce, Series P25, No. 441,
May 19, 1970.

bearing age has been declining, which means again that we have to rely on the much weaker "grandparent motive" rather than the parent motive for political support of educational expenditures. When the present "bulge" gets to be grandparents in the early twenty-first century, it will dominate the voting population and the effects on educational expenditures may well be disastrous. Now, of course, this "grandparent effect" is modified by the fact that the grandparent of 1975-2000 will come out of the low birth cohorts of 1920-45. This also means, however, that there may be some deficiency in the numbers of mature people available for positions of leadership, though this effect is offset by the large proportion of these cohorts surviving into middle age.

One long-run effect of the "rectangular" age distribution has received little attention, but may eventually necessitate a drastic change in the educational system. Hierarchical structures tend to be "triangular" with large numbers in the lower (younger) levels and small numbers in the higher (older) levels. A rectangular age distribution means that older people are increasingly squeezed out of the hierarchial structure and lose status. We have hardly begun to think about how to adapt the educational system to this kind of total life pattern in which the chances of promotion become less and less.

Redistributing Income and Educational Opportunity

A question for the future, which is of course much more difficult to answer, is whether there would be any changes in the structure of the demand for education, especially in the differrent age cohorts. In the lower age groups this is mainly likely to be reflected in the demand for increasing quality rather than quantity though there may be an exception to this in the pre-school years. There is likely to be an increasing demand for kindergarten and pre-kindergarten school experiences. The main changes here may be seen in the bottom 20 percent of the income distribution where it is widely recognized that the educational system is grossly unsatisfactory and has contributed to the perpetuation of the poverty subcultures. This, however, is going to require an extension of the grants system for education from local communities to wider state and national communities simply because this is the only way in which income can be distributed from rich communities to poor ones. Bringing up the expenditure per child of the poor communities and states even to the present median would involve a substantial expansion of the proportion of the economy going to education, even if the total number of children were to remain constant. One possible optimistic consideration in this situation is that as the number of children declines educational expenditures are likely to exhibit a lag, as on the whole it is much harder to get things out of budgets than it is to get them in. There may be a considerable possibility here for improving the quality and distribution of education, with relatively constant total educational budgets but declining numbers of children, unless budgets are tied mechanically to the number of pupils.

The Youth Culture and Education

There seems little doubt that there has been substantial improvement in the quality of American education in the last decade, perhaps due to Sputnik, at least in the upper and middle income groups, in terms of an increase in the rate of acquisition of knowledge. The curriculum reforms of the last decade or so have certainly had some effect though it is hard to measure this. The hardest thing to assess is the "moral culture" of children and young people as this is developed by the sheer fact of segregation. This is the first society in human history that has effectively segregated not only its children but its teenagers and a considerable proportion of its youth in situations where the peer group is the major factor in determining the culture and adults are present in a very small minority and often in a quasi-custodial or even hostile role. The effect of this may be quite incalculable and by no means necessarily desirable. In all previous societies youth cultures have been severely modified by the fact that adolescents and young people especially have begun work at an early age and hence have developed into adults in the midst of an essentially adult society in the work situation. Apprentices, office boys, and so on naturally develop some youth culture of their own, but it is greatly modified by the fact that for a good part of the day they have to conform to the adult culture around them.

Today we have a segregated youth culture which has an enormous dynamic of its own, quite at odds with the adult culture from which it is so sharply separated. Youth cults, however, are likely to be very unsatisfactory as preparations for a total life pattern. Youth, after all, has no future. A culture which idealizes it and models itself on it is likely to get itself into serious trouble, especially in the demographic situation where the familiar pyramidal age distribution with a very small number of old people being replaced by a rectangular age distribution with large numbers of old people. It may be that the learning process which is going on in the present generation of young people in regard to their attitude toward education may be so radical that when they become adults the whole educational system will be revised radically in the interests of developing satisfactory personal identities, satisfactory whole life patterns of behavior, and an integration of youth with the society in which they are embedded. This, however, is a wild speculation and should not be taken too seriously.

The War Industry Versus the Education Industry

Another set of considerations which must be carried in mind in considering the future of the educational segment arises out of the fact that it is so largely financed through the grants economy. Consequently any changes in the overall structure of the grants economy are likely to have disproportionate effects on education. The major factor here of course is the future of the war industry. If we have substantial disarmament, reducing the war industry down to, say, 4 percent rather than the present 8 percent of the economy, this is likely to release a proportionate amount of the public grants economy for other purposes, to which education is an important claimant. On the other hand if the international situation worsens or if we develop still wilder delusions of national grandeur than we now have so that the war industry expands, we can expect one of the major victims to be public expenditures on education. Where the future of the international system is so uncertain we have to be extremely "liquid" in our planning. Educational planning in particular must be prepared for the unexpected. We should be prepared both for good times and for bad.

Effect of Methods of Financing Education on Expenditures

Another possible future set of changes here, which it is at least not absurd to contemplate in the next ten or twenty years, is a radical change in the methods of finance of education which might produce quite large changes in structure. Thus, suppose that we had something like the "Killingsworth plan" as I have been calling it,[3] for setting up educational banks which would lend students the full cost of their education, the loans to be repaid by a surcharge on income tax throughout the subsequent life of the borrower. The surcharge would not need to be large, perhaps 1 or 2 percent for higher education. The person benefited most in terms of increased income would pay most and we would at least get education out from under the grants economy in part into something that looks like the market sector, thus at least avoiding the stigma of "charity." Unfortunately this proposal, which seems to be eminently sensible, has run into severe political opposition especially from the Association of Land Grant Colleges. It certainly merits serious political consideration. If we run into continued "taxpayers revolt" as we are all too likely to do, proposals of this kind may be much more politically acceptable. The proposal, after all, is based on a very fundamental truth, that for the individual who receives it, education is an investment and frequently a very good investment, and there seems to be no reason why we should not devise financial institutions to recognize the fact. Education as an investment, of course, is not the same as investment in a house, and obviously cannot be financed by a chattel mortgage. The fact that it is a peculiar kind of investment, however, does not eliminate it as an investment, and we should be able to devise peculiar financial instruments and institutions which could deal with it.

Technology and the Education Industry

Another element of the current situation which is extremely hard to appraise is the future interaction between education and business, particularly in the form of new educational hardware technology. Beginning about 1965 there was a great flurry of interest in American business corporations in this problem. A number of established corporations such as Xerox, Raytheon, RCA, IBM, Westinghouse, and General Electric allied with Time, Inc., which established the General Learning Corporation, have all either acquired educational subsidiaries or have developed divisions in this field. In addition some old established publishing houses, especially McGraw Hill, Appleton-Century-Crofts, and Crowell-Collier-Macmillan, have been edging into the business of educational hardware and there are a considerable number of new and small enterprises any one of which might conceivably turn out to be an incipient educational IBM. A considerable controversy has been raging, centering around Antony Ottinger,[4] around the possible value of all these new developments, and here again, almost like the future of the war industry, one simply has to advise a "wait and see" policy. Up to now at any rate there are no signs of the "Model T" among educational hardware and even fewer signs that anyone is capable of driving it. Up to now there is not all that much challenge to the ancient inventions of the book and the teacher—the latter especially being a remarkable nonlinear computer of fantastic capacity which is produced mostly by unskilled labor. Nevertheless in this field, as in many others, one has always to be prepared for the unexpected.[5]

One can express modest confidence, however, that any major change in the educational industry will have to be a combination of financial, organizational, and technical changes. Of these it is quite possible that the financial and organizational changes will have to come first. As long as the near-monopoly of the public school system exists intact, substantial technical changes are unlikely to be forthcoming. A very tantalizing question for the future is the mixture of public and private enterprise in the educational industry. It is easy to underestimate the size of the private sector even now, especially if we include the kind of training programs which go on in industry outside the formal educational system. These fall more in the category of adult education and have a very different set of problems from the education of children and young people. A change in methods of finance to one which subsidizes the student rather than the school might indeed set off drastic changes in the organization of the whole industry. This seems unlikely in the next ten years. About the only conclusion we can safely draw from this discussion is that the future of the educational industry in regard to its structure, if not perhaps in regard to its overall size, is highly uncertain. It may look very different in ten or twenty years or it may look much the same as it is now. This may be a somewhat depressing conclusion, but honesty demands it.

FOOTNOTES

1. Fritz Machlup, *The Production and Distribution of Knowledge in the United States* (Princeton University Press, 1962).

2. E. G. West, *Education and the State: A Study in Political Economy* (London: The Institute of Economic Affairs, 1965).

3. Charles C. Killingsworth, testimony to the United States Senate on Employment of Manpower, September 20, 1963. Also, *How to Pay for Higher Education*, Presidential Address to the Economic Society of Michigan (1967), mimeo.

4. Antony Ottinger and Sema Marks, "Educational Technology: New Myths and Old Realities," *Harvard Educational Review*, 38, 4 (1968).

5. "Expecting the Unexpected: The Uncertain Future of Knowledge and Technology," in *Prospective Changes in Society by 1980 Including Some Implications for Education*, Edgar L. Morphet and Charles O. Ryan, Reports Prepared for the First Area Conference. Designing Education for the Future. An Eight-State Project (Denver, Colorado, July, 1966), pp. 199-215.

CHAPTER 2

The Human Capital Approach To Education

THEODORE W. SCHULTZ

The idea of human capital formation has opened a new research area that is proving to be a fruitful extension of economics. Although the concept of human capital has become increasingly useful in economic analysis, all too little use has been made of it in clarifying policy choices. While most of these new studies have policy implications, it is still far from clear how the new information from them can serve those who are making the policy decisions that determine the allocation of resources, not only to education, but also to the wide array of other forms of human capital. The task is one of decoding and interpreting these findings with the view of making them meaningful in arriving at policy decisions. The thrust of this paper is to bring them to the fore and to show their relevance to decisions that pertain to the allocation of investment resources to education. I shall begin with a comment on the economics of the human capital approach to education. I shall then present a set of propositions that are supported by it and that have some allocative implications for education.

A PREFACE TO HUMAN CAPITAL ECONOMICS

We the people have many different attributes. We have preferences. We have skills and knowledge that contribute to the possibilities of realizing our preferences. Our skills and knowledge are resources; accordingly, in addition to natural or material resources, we have human resources. The resources that we have, as of any given date, we call a stock. There are obviously numerous classes of stocks—a stock of machines consisting of many different types, and so on for factories, land, and also persons with skills. When these stocks are entered into accounts, measured in terms of one or more of their technical attributes (physical, biological, psychological, or some other), the information is not sufficient for an *economic* accounting. We simply cannot meaningfully aggregate machines plus factories plus land plus skills. What we need is a measuring rod that can be commonly applied to all stocks. If the stock contributes producer services or renders consumer satisfactions, and for this reason is scarce, it can be transformed into capital. The economic value of it as a form of capital is a function of the income stream that it renders. Thus, the market or shadow value of a particular stock is simply the capitalization of the expected (permanent) income stream.

What has been said so far, to the extent that it can be applied to education, is that skills and knowledge acquired in schools are a part of our human capital. For inventory purposes, we speak of them as years of schooling but to get on with economic analysis, it is necessary to transform them into forms of capital. Accordingly, in this paper, we shall treat them as human capital, the formation of which depends upon our schools, i.e., on formal, organized education.

Whether it be the role of the student, his family, or that of public or private agencies to make the allocative decisions with respect to education, the human capital approach treats them as investment decisions—*investment in man.* It assumes that the form and the amount of human capital can be altered by an appropriate investment (disinvestment). Seeing that resources for investment are scarce, to approximate an efficient allocation it is necesary that the investment, whether it be human capital or some other form, be made in accordance with the priorities set by the relative rates of return on all material and human investment opportunities. Let me illustrate. Since expenditures for Head Start and on graduate work produce two very different forms of human capital, we would want to know the relative rates of return. Suppose the alternative opportunities throughout the U. S. economy were producing in general about 15 percent, that the rate of return on expenditures for Head Start were 50 percent or more, and that the returns on graduate work were less than 15 percent. Given this information with respect to the rates of return, it would tell us the direction of the shifts that should be made in the allocation of investment resources as between Head Start and graduate work and these in turn in relation to investment opportunities in general in the rest of the economy.

Thus far, I have been using the term "human capital" as if it were obvious what it means. Although by implication the meaning of the concept has been at least in part revealed, it calls for further definition. Consistent with what has already been noted, human capital has the fudamental attributes of the basic economic concept of *capital*; namely, it is a source of future satisfactions, or of future earnings, or both of them. What makes it *human* capital is the fact that it becomes an integral part of a person. But we were taught that land, capital, and labor are the basic factors of production. Thus we find it hard to think of the useful skills and knowledge that each of us has acquired as forms of capital. Structures and equipment are of course capital. They are durable and they render productive services that have an economic value. Land too can be improved by means of investment and, at least to this extent, it is capital that has been formed by man. But back in our minds, human beings are different in this respect. We appeal to the concept of labor, i.e. laborers; they render productive services that have an economic value; they receive wages or salaries or entreprenurial income for what they do. But if we stop there, we fail to see that the capabilities of man have been produced and can also be enhanced by means of investment. In presenting the propositions that follow, more of the underlying economics of human capital will be revealed.

PROPOSITIONS WITH POLICY IMPLICATIONS

It will be convenient to group these propositions under the following headings:

1. The condition of our educational capital.
2. Sources of inefficiency in the allocation of resources to education.
3. Investment opportunities in this area in terms of rates of return.

These propositions are an endeavor to summarize and bring to a head some of the new information that is becoming available from research in this area. They apply to the United States, since the underlying research is based mainly on U. S. data. In large part, the research is restricted to a post-World War II period, a period during which economic conditions have been highly favorable for the formation of educational capital. The response of students and schools to these favorable circumstances has been strong. The trends in the key educational indicators show a marked upward movement. Nevertheless, these trends conceal many lost opportunities.

The social and economic setting pertaining to education in the U. S. is marked by deeply embedded disparities that have persisted despite the vast increases in educational expenditures. Some of them are of long standing and others are relatively new, mainly a consequence of recent economic changes. Among the long standing disparities are the regional differences, with the South still lagging seriously. The different sectors of the economy have fared very unequally from the overall growth of the economy. The decline of the agricultural sector, the massive out migration of farm people, coupled with the special difficulties that rural schools face and their lack of school resources has left a large part of farm and rural schooling far behind.[1] The long history of discrimination against Negroes and also against some other ethnic groups is the source of one of the most serious disparities that still characterize our education.[2]

The setting would be incomplete if we did not see clearly and take into account the role that the U. S. economy has played in increasing the demand for high skills and associated knowledge. The new superior inputs, mainly the fruits of the advances in science, have undoubtedly been a major source of the increases in the demand for highly skilled people. A part of it has come from the large expenditures by government for research and development and also expenditures for highly advanced equipment requiring technical and scientific skills of a high order, both to produce and to operate. Government expenditures for these purposes have been leveling off and thus the strong upward trend of the post-war period in this respect must be seen as moving more nearly horizontally. It should also be noted that the rise in the economic value of human agents makes new demands on institutions and that these institutions lag in adjusting to these new demands.[3]

The Condition of our Educational Capital

In terms of either years of school attendance or cost of schooling, the population and the labor force of the United States possess more educational capital per person than their counterparts in any other country. Seeing the magnitude of the existing stock of educational capital, it could be that we have overinvested in education. Suppose parents or taxpayers were to raise this issue—what is the answer? In this context, it is not a moral or cultural issue. The future satisfactions that accrue to the student (family) from his education do not exclude moral or cultural components. It thus becomes a question of whether the future satisfactions and earnings from the investment in the additional education will fetch as high a rate of return as could be had turning to alternative investment opportunities. This issue will be examined more fully under the third set of propositions.

Our purpose in examining the condition of our educational capital is to take our bearing as to where we have arrived in education and to search for clues that may guide us in seeing where we have done badly or well in allocating resources to education. As of 1968, over three-fifths of the U. S. civilian labor force, 18-64 years old, had completed four years of high school or more including the one-eighth of the labor force who had completed four years or more of college. Table 2-1 gives some historical comparisons.

TABLE 2-1
U. S. CIVILIAN LABOR FORCE, 18 TO 64 YEARS OLD, BOTH SEXES, FOR SELECTED DATES

	April 1940	*March 1957*	*March 1968*
Total, 18-64 (in millions)	51	60	72
Years of school completed (in percent)			
Less than 5 years-elementary	9.2	5.6	2.5
5 to 8 years—elementary	40.4	26.2	16.0
1 to 3 years—high school	18.4	19.8	18.4
4 years–high school	19.7	30.5	38.3
1 to 3 years—college	6.5	8.8	12.3
4 or more years—college	5.7	9.2	12.5
	100	100	100
Median school years completed	9.1	11.8	12.3

SOURCE: Special Labor Force Report No. 103, U.S. Department of Labor, February, 1969. (Table A because of rounding sums of items may not equal 100).

The educational capital that is an integral part of the labor force has been increasing at a much higher rate than that of reproducible nonhuman capital. The estimates in Table 2-2, for the period from 1900 to 1957, show that this form of educational capital was 22 percent of that of nonhuman wealth in 1900; and by 1957, it had risen to 42 percent of that of reproducible nonhuman capital.[4]

TABLE 2-2
TOTAL VALUE OF THE STOCK OF EDUCATION AND OF REPRODUCIBLE NONHUMAN WEALTH IN THE UNITED STATES, 1900 TO 1957, IN 1955 OR 1956 PRICES

	Educational Stock of Population 14 Years and Older	*Educational Stock of Labor Force 14 Years and Older*	*Stock of Reproducible Nonhuman Wealth*	*Percent Col. 2 is of Col. 3*
		(In Billions of Dollars)		
	(1)	(2)	(3)	(4)
1900	114	63	282	22
1910	168	94	403	23
1920	227	127	526	24
1930	328	180	735	24
1940	465	248	756	33
1950	656	359	969	37
1957	848	535	1270	42

SOURCE: Columns 1 and 2 are in 1956 prices; column 3 is from Raymond W. Goldsmith who kindly made available to me his estimates of U.S. (national) reproducible wealth in 1947-49 prices. I then adjusted them to 1956 prices. See my "Education and Economic Growth," *Social Forces Influencing American Education*, National Society for the Study of Education (Chicago: University of Chicago Press, 1961).

A more precise view of the differences in the rates of increase in selected stocks of capital over time is presented in Table 2-3. Note that between 1929 and 1957 the annual rate of increase in educational capital in the U. S. labor force was twice as high as of reproducible tangible wealth. Although these estimates have not been undertaken for the period since 1957, there are strong indications that the trends shown in both Tables 2-2 and 2-3 have continued. Table 2-1 supports this inference because it shows large increases since 1957 in the percent of the labor force with four years of high school or more. This is the part of education that costs by far the most per year of schooling and presumably also adds the most, per year of schooling, to the stock of educational capital.

TABLE 2-3
ESTIMATES OF VARIOUS STOCKS OF CAPITAL AND ANNUAL RATES OF INCREASE BETWEEN 1929 AND 1957, IN THE UNITED STATES IN 1956 DOLLARS

	Billions of Dollars *1929* (1)	*1957* (2)	*Annual Rate of Growth (percent)* (3)	*Rate Applied to 1957 (2) x (3) (Billion Dollars)* (4)
1. Reproducible tangible wealth	727	1,270	2.01	25.5
2. Educational capital in population	317	848	3.57	30.3
3. Educational capital in labor force	173	535	4.09	21.9
4. On-the-job training of males in labor force	(136) for 1929	347	5.36	18.6
5. Total of Lines 3 and 4				40.5

SOURCE: Line 1: Raymond W. Goldsmith, "Statistical Appendix" to *The National Wealth of the United States in the Postwar Period*, Table A-2, adjusted to 1956 dollars (quoted with permission of Goldsmith); lines 2 and 3: "Education and Economic Growth," in *Social Forces Influencing American Education*, ed. N. B. Henry (Chicago: University of Chicago Press, 1961), Table 14, with 1930 estimates reduced by 3.57 and 4.1 percent respectively to give estimates for 1929; line 4: rough guesses based on Table 2 in Jacob Mincer, "On-the-Job Training: Costs, Returns, and Some Implications," appearing in my "Reflections on Investment in Man," *The Journal of Political Economy*, 1962. An estimate for 1958 was adjusted downward by 5.36 percent to obtain the 1957 figure and to place both 1929 and 1957 on a 1956 dollar basis; the 1954 dollar estimates were increased by 4.6 percent.

The condition of any stock of reproducible capital is a product of past investment decisions. It would be rare that such a stock did not reveal some uneconomic investments because of changes in circumstances that could not have been anticipated at the time the investment decisions were made. There are other uneconomic investments that could have been averted had more attention been given to efficiency considerations in allocating resources, say to education. The educational stock, despite its growth, size, and contributions, is far from optimum for reasons of the second sort. Some of these have already been identified and others will be considered below.

The condition of any stock of reproducible capital depends on whether it has been properly used, on its age, on the depreciation and obsolescence it has been subject to, and on the extent to which it contains maldistributions for reasons of supply or demand. Educational capital is not spared in these respects. The propositions that follow pertain to some of these.

Unemployment Effects. Educational capital deteriorates when it is kept idle. Thus unemployment impairs the skills and associated knowledge that a worker has acquired. Physical capital as a rule also deteriorates when it stands idle. But there is a difference; e.g., a fleet of freighters can be placed in "mothballs" for years; a corps of scientists obviously cannot. Fortunately, during most of the sixties, the U. S. economy enjoyed a high level of employment.

The consequences of changes in the level of employment also reach into the classroom; they may affect adversely the signals that guide the formation of educational capital. When the level of employment is either appreciably below or above "normal," it distorts and impairs the information that students and schools require in making efficient allocative decisions with regard to education.

Productive Life of Educational Capital. None of it lasts beyond the death of the individual who has it. But unlike the wonderful "One-Hoss Shay," built in such a logical way to last exactly to the planned final day, the productive life of educational capital typically does not go to pieces all at once. It depreciates along the way, it becomes obsolete, it is altered by retirement and by the state of employment. The One-Hoss-Shay model with no depreciation, no obsolescence and then sudden death, will not do.

Although knowledge about these processes is still meager, what is known should be taken into account in the formation of educational capital. Solutions to the idleness associated with high unemployment, and with premature retirement, and by sickness would contribute to the effective life of skills and knowledge acquired in schools. The critical problem, however, is the high rate of obsolescence of much of our educational capital. Changes in the demand for skills are an obvious attribute of our type of economic growth. New techniques of production require new skills and old skills become obsolete. It is, of course, possible at some price to reduce the rate of technical changes; it is also possible to postpone some of the employment consequences; e.g., by extending the art of featherbedding, also at a high price in terms of economic efficiency.

The advances in the sciences along with the fruits from other research endeavors are also contributing to this obsolescence; students in engineering today acquire knowledge that had not been established when engineers who received their degrees a decade or longer ago were in school.

It is possible to develop programs of instruction that would provide additional flexibility in the ability of the student to reform and renew his skills in adjusting to the changes in the demand for them. Although the optimum combination of specialized and general instruction is an unsettled issue, what is becoming increasingly clear is that the higher the level and the better the quality of the education that a student obtains, the more he will invest and gain from on-the-job training after he has completed his formal schooling.[5] Training for specific jobs including a wide array of highly specialized skills should in general be postponed. In addition to on-the-job training, there are efficient adult learning arrangements. Going up the scale in gaining flexibility, knowledge pertaining to principles and theories carries the promise of reducing this obsolescence. The highest priority should be given to instruction which is devoted to problem solving, learning how to bring established knowledge to bear and how to use analytical methods in solving problems.

Distribution of Educational Capital. The existing stock of educational capital in the United States reveals many different types of distributions. The class of distributions that is relevant here are those that can be put to an economic test with the implication that any mal-distribution in it would mean that to some extent the stock is not an optimum. What can we learn here that would improve our allocative decisions?

Investment in education is heavily weighted in favor of youth. The fact that schooling costs less when one is young and renders satisfactions and earnings for a longer period gives youth a strong comparative advantage. Thus, there are compelling economic reasons for schooling to be acquired early in life. Then, too, as a result of the marked secular rise in the level of schooling, young people enter the labor force with more educational capital than earlier generations had when they started to work. Thus, the personal distribution of educational capital by age of workers is very much skewed towards youth. But here too, from an investment point of view, this secular advantage of youth is no indication that there has been a mal-investment. Youth has still another advantage, but the gains from it are in part acquired at the expense of older workers. The advances in knowledge, as noted earlier, become an integral part of instruction, and as this occurs these advances are the source of new skills. But these new skills tend to make the skills of older workers obsolete. It would be very convenient if workers with obsolete educational capital (skills) could be abandoned as obsolete physical capital can be treated. This option, however, is foreclosed on welfare grounds. Much remains to be done in clarifying policy choices in solving this problem of gains or losses.[6]

No small part of the inequality in schooling arises from the inequality in the distribution of personal income. Children of poor people acquire not only somewhat less schooling, but what is much more important, the schooling they obtain is lower in quality than that of the children of families (in communities) with higher incomes. Reforms in public finance, while they have accomplished a good deal, are still far from having solved this problem. Reforms to bring the capital market into play with the view of having it provide the necessary additional resources where people are poor is not solving this problem. Quite obviously, tax exempt school bonds is no solution.

The fact of the matter is that schooling is neither free nor equal. The two common phrases "free public schooling" and "equal educational opportunities" are, in this context, empty phrases. Schooling is inescapably an expensive enterprise, privately and publicly. The term "opportunities" is most ambiguous. If equal educational opportunities means, as some would have it, that all high school graduates who want to go on to college and who have the ability are to receive a *free college education*, it would be an objective that is incompatible with economic efficiency and with social welfare. It would induce mal-investment in educational capital and it would increase the inequality in the distribution of personal income in the years ahead.

Nevertheless, the policy implications of the inequality in schooling that is associated with the inequality in the distribution of personal income are strong and clear. Relatively more of the resources entering into education should be allocated in favor of the children from poor homes.

As already noted, the condition of the stock of educational capital is adversely affected by an overemphasis on quantity of schooling relative to the emphasis given to its quality. In quantitative terms looking at days of school attendance per year, there has been a marked rise in attendance in elementary and high schools. At the turn of the century, for the country as a whole, the average number of days was 99. It is now in the neighborhood of 160 where it has leveled off. Furthermore, there has been a marked reduction in the differences of the number of days of school attendance on the part of pupils in different parts of the United States. But the differences in the quality of schooling are large and they are the heart of one of our most serious problems especially so in elementary schooling. It is in terms of quality that many rural children and many children from the homes of nonwhite families are at a marked disadvantage. Later on in this chapter when we turn to the rates of return, it will be shown that a high priority should be given to improving the quality of schooling.

Another view of education is its distribution between higher education on the one hand and elementary and secondary schooling on the other. Closely related to in the paragraph above is the underinvestment in elementary and perhaps also in secondary schooling relative to that entering into higher education. No doubt in considerable part the reason for this mal-distribution is a result of the way we have financed education. The part of higher education that is dependent upon public revenue has developed mainly with the growth of the land grant universities. They are state universities, largely supported by revenue from the state, although the amount of federal funds has become increasingly important. Elementary and high schools started as local enterprises and the progress in enlarging the financial base of these schools has been a difficult institutional reform. Federal funds in any significant amounts to support these schools is a very recent development. The unequal distribution of personal income, already discussed, is part of the explanation of this problem. The differences between regions, with the South lagging, and the particular effects that economic growth has had upon some economic sectors, notably the adverse effects it has had upon the size of the agricultural population, are also a part of the explanation. The policy implication is in the underinvestment in elementary and secondary schools relative to the amounts that are invested in higher education;

the economic measure of this fact is in the differences in the rates of return as will be shown below.

Sources of Inefficiency in the Educational Component of Human Capital

Some of these inefficiencies, perhaps the most important ones, stem from the personal attributes of human capital. Physical capital has the legal status of property. Human capital, however, is not protected by this legal mantle except in slavery. The critical fact at this point is that human capital and the person who has it are inseparable. It is for this reason that educational capital is subject to the social and legal status governing the rights of persons. The freedom of choice in acquiring educational capital and in making use of it is accordingly inseparable from this status of the rights of the person. A few examples may be instructive. Since a person cannot indenture himself or enter into a contract that would encumber his human rights, it follows that in making a loan to a student for his education, the property right of the lender in the capital funds that he transfers to the student cannot be covered by a mortgage on the student. In another domain, whatever the causes of job discrimination, it can have strong adverse effects on the motivation of students in acquiring an education. Consider next a situation where the appropriate job for an individual, given his education, is at another location. It would be encumbant on him to migrate to a new location to take advantage of his skills. If he is the head of a household, the requirement would be that the entire family would have to migrate to the new location. The married woman is under special constraints in the use to which she can put her education in participating in the labor force. The propositions that follow are an attempt to bring a number of these sources of inefficiency to a head along with a comment on policy implications.

Tied Women. In marriage, as a rule, the woman regardless of her education, is bound in seeking a job in the labor force appropriate to her skills to the location where her husband works. Suppose the cultural rules were to designate the woman as the head of the household and that her job opportunities would determine the location of work of the family! The man would then be compelled to adjust his lot to this turn in circumstances. For women, it would imply that the incentives to acquire a higher education including advanced professional degrees would be vastly enhanced. Major metropolitan centers tend to reduce this constraint that marriage imposes upon the woman as she seeks to enter the labor force.[7] It is most severe in a strictly rural or farming area. In principle, the major policy implication, taking the long view, is to discover and develop adjustments, some that are exogenous to the marriage itself, such as the enlarged opportunities of a major metropolitan center, and others; and perhaps more important, are the adjustments that become acceptable in the marriage arrangements itself. As this occurs, the investment opportunities in education, and especially so in higher education, open to women would be enlarged.

Job and School Discrimination. The adverse effects of racial and religious discrimination upon the availability of jobs, wages, and salaries and upon education are measurable and recent research provides firm estimates. It is also evident from our recent history how difficult it is to free the job market and the educational enterprise from the adverse effects of the social virus of discrimination which is so deeply embedded in the individual preferences that account for the discriminatory behavior. The effects of discrimination upon the personal distribution of the existing stock of educational capital is an open record. The professions have not been free of it; employment in the craft and building trades is plagued with it; but it is the Negro in the rural South who is burdened with the worst of the consequences of job and school discrimination. The studies by Welch of the effects of discrimination upon the Negro in the rural South strongly supports the above inference.[8]

The hindrances to the free choice of professions and the role that professional associations and governmental agencies play, with major attention to the medical profession, are shown by Friedman and Kuznets in one of the early studies in this area.[9]

An approach that brings economics to bear more generally has been developed by Becker in *The Economics of Discrimination.*[10]

The mal-investment in education that is a consequence of discrimination is of two major parts. First, students and their families who are subject to discrimination will have less economic incentive to acquire the amount and quality of schooling that they would have were they free from discrimination. Thus, there is for them an underinvestment. Consider the following. White students attending high school are aware, as are their parents, that the additional earnings associated with the completion of high school are likely to bring them a 25 percent rate of return on the additional cost of the high school education. Suppose also that because of job discrimination, Negro high school students are aware, as are their parents, that the completion of high school will not improve their earnings, and thus for them the rate of return on the additional cost of attending and completing high school will be zero. Under such circumstances, we would expect and we also find that white students in general give a high priority to completing high school. For Negroes, we would expect the opposite to be true. The evidence is mixed because there are substantial differences on the rate of return on the extra cost that they presently receive depending upon where they are located and associated circumstances. Second, it is a small step from the above to the differences in motivation to attend and to perform well while in school. The inference is that an important part of the observed differences in motivation between white and Negro students is a consequence of job discrimination against Negroes.

Table 2-4 shows that the difference in income between Southern white and nonwhite rural farm males who are 25 years old or over, in 1959, was $790 for those who had completed 5-7 years of school, and $1,950 for those who had completed 12 years of schooling. For those with the least schooling, about one-third of the difference in income is attributed to market discrimination against physical labor per se. Two-thirds is attributed to market discrimination against schooling. For those with 12 years of schooling, the absolute value of the estimate of the market discrimination against physical labor is no larger than it was for those with the least schooling. It accounts, however, for little more than one-eighth of the difference in income. Thus, by all odds, the major part of the difference in income is attributed to discrimination against schooling. In his study, Welch proceeds to separate the latter component into two parts—that which is associated with the inferior quality of schooling, which as the table shows accounted for $200 of the difference for those with the least schooling and $630 for those with 12 years of schooling. The second part, namely market discrimination against education, in the language of Welch, predominates, showing $340 for the group with the least schooling and rising markedly for those with 12 years of schooling where $1,070 is attributed to the discrimination against this level of education.[11]

It is appropriate to quote the policy implications that Welch has drawn from his findings:

> It would seem that discriminatory quality of schooling is more easily eliminated than market discrimination, because legislative authorities have relatively little control over such markets. In fact, to the extent that market discrimination is determined largely by sociological phenomena, we cannot expect these factors to be eliminated either quickly or easily. Nevertheless, the elimination of discrimination in quality of schooling may be an important vehicle for removing income differences; for an improvement in the quality of schooling will: (1) reduce the observed discrimination against schooling, (2) induce an increased investment in schooling, and (3) induce greater effort while in school, which will increase the quantity of education per unit of attendance time. In addition, the reduction of differences in education may reduce associational friction, which then reduces discrimination.[12]

TABLE 2-4

ESTIMATED IMPACT ON NONWHITE INCOME OF MARKET DISCRIMINATION AND INFERIOR QUALITY OF SCHOOLING

	Years of Schooling Completed		
	5-7	*8*	*12*
Income:			
White	$2,090	$2,340	$3,790
Nonwhite	1,300	1,480	1,840
Difference	790	860	1,950
1. Impact of market discrimination against physical labor	250	250	250
2. Impact of discrimination against schooling*	540	610	1,700
(a) Inferior quality of schooling	200	230	630
(b) Market discrimination against education	340	380	1,070

*The adjustment for interaction between quality of schooling and market discrimination against education is prorated according to the proportion of the total (difference in the return to schooling) accounted for by each. Actually, interaction represents 14 percent of the total discrimination against schooling.

SOURCE: Finis Welch, "Labor-Market Discrimination: An Interpretation of Income Differences in the Rural South," *Journal of Political Economy*, vol. 75, no. 3 (June, 1967). From Welch's Table 5 on page 239.

Capital Market. Would that the capital market could serve students who require funds to invest in their education as effectively as it does those who are engaged in the formation of physical capital. The difference is large. It is not simply a matter of more imperfections in the capital market as it serves students. The difference in the legal foundations of property and of the rights of persons are a major part of the explanation. In the domain of physical capital, the suppliers of investment funds function within well established institutions which rest on the rights of property. Funds that enter into the formation of human capital regardless of the form that it takes are not property. As part of the person, educational capital is subject to the rights of persons and these rights are not tailored to enhance the economic efficiency of the capital market.

There is room, nevertheless, for improvements in the capital market serving students. A good deal of experience is being accumulated from different approaches in providing loans to students, both on private and public account. It is undoubtedly true that loans to students will play an increasing role in financing higher education in the years to come. Where the family has tangible assets, property of value, the use of such assets as collateral would not be a departure from traditional capital market experience. Loans which rest on the level of the income stream of the family is a development that is still in its infancy. But with the relatively high level of income of so large a part of U. S. families, it carries considerable promise. In part, it will be necessary to rid our social mores from some convenient clichés, honorable as they may appear. The one that is pure fancy occurs most frequently where students apply for financial aid from the university in their pursuit of graduate instruction and research. Having completed the Bachelor's, they have taken a private vow that they must now be financially independent of their parents. How convenient! Although most of them reveal that the income of their parents is surprisingly high, it does not occur to them that this declaration of financial independence is self-serving in their plea for financial aid from the university in a context where the graduate work will add to their earnings, and thus, if the aid is granted, promises to increase the inequality in the distribution of personal income in society.

Tax Laws. The unequal treatment of physical and human capital by our tax laws is another source of inefficiency in the allocation of investment resources to education. As already noted, educational capital like reproducible physical capital is subject to depreciation and obsolescence. The established tax treatment takes account of both depreciation and obsolescence in the case of physical capital, but this accounting is not extended to educational capital. Although earnings foregone while attending school do not enter into taxable income, none of the direct private cost of education is treated as capital. In brief, our tax laws including the extension from time to time of investment credits appear to be all but blind to the fact that educational capital entails maintenance, depreciation, and obsolescence. More equal treatment with respect to each of these factors would enhance the investment priorities in education relative to investment in physical capital forms.

Incentives and Information. When it comes to making optimum allocative decisions that pertain to the investment in education, the system of incentives is weak and at many points seems virtually nonexistent and the state of information is in bad repair. This situation accounts for many inefficiencies in the way investment resources are allocated in this area. But who should make these allocative decisions? Who is best qualified? One strongly held view is that students and their families are best qualified. Those who hold this view appeal to consumer sovereignty and thus to the private self-interest of students (families). There is another view that contends that there are substantial external economies or social benefits that accrue not to the student but to others in society, and therefore these allocative decisions can best be made by public or other social bodies. What is the contribution of school administrators in managing our complex educational enterprise? In view of the inefficiencies that are consequences of poor incentives and poor information, the effects of these on the decisions of students, teachers, administrators, and public bodies requires a brief comment.

The key to student sovereignty is the private self-interests of students and of their families. Their self-interest should be sufficient to bring about an efficient allocation of investment resources to education under the following conditions.[13]

1. Competition in producing educational service along with efficient prices of these services;
2. Information required by students is optimal;
3. Efficient capital market serving students; and

4. No appreciable social benefits (losses) from education.

A clear view of the function of the private self-interest of students in these allocative decisions is blurred by arguments about the underlying conditions. Surely it is possible to have competitive pricing of educational services. As noted above, student loans from public and private sources can be devised to provide additional capital. It should also be possible to take account of social benefits (losses). But if student sovereignty has an Achilles' Heel, it is in the domain of information; the long standing controversy over this issue is as unsettled today as it was when the classical economists divided on this issue.[14]

The following quotation summarizes the underlying issues inherent in the student sovereignty approach.

> In enlarging the scope and improving the performance of student sovereignty in allocating resources to . . . education, the gaps in information and the distortions in incentives really matter. On earnings foregone, students are well informed, but on their capabilities as students they are in doubt. With regard to the benefits that will accrue to them, the state of information is far from optimum. But much worse still is the lack of information on the differences in the quality of the educational services of different colleges and universities. Nowhere are students confronted by prices for these services that are equal to the real cost of producing them, and therefore the prices to which they respond are not efficient prices. As a consequence, no matter how efficient students are privately in their decisions, from the point of view of the economy as a whole, the allocation of resources to . . . education will not be efficient.[15]

Turning to policy implications, the ideal price for the educational services that students obtain should be neither more nor less than the real cost of producing these services. This proposition, however, does not support the view that there should be no difference between public and private tuitions or, for that matter, among public or among private schools. Equality of tuition would merely replace one type of price distortion by another type because it would conceal the differences in the quality of educational services provided by different schools. The policy implications pertaining to the capital market have been discussed earlier. Thus, we come to the task of improving the state of information. A major step in accomplishing this task is the development of efficient prices to which the students can respond. But more than this is required. They must know what they are buying. Specifications that are only in quantitative terms are not sufficient. Much depends upon knowing the differences in the quality of the educational services. Truth in advertising is an approach that might well be applied to the materials that schools make available and especially to the catalogues that universities issue.

The difficulties in reckoning social benefits or losses are set forth elsewhere and it does not seem appropriate to burden this chapter with them.

Educational Investment Opportunities Guided by Rates of Return

Despite the inefficiencies that burden the allocation of resources to education, students, their families, public and private bodies endeavor as best they can to identify the opportunities in education. The purpose of this section is to present some useful information from recent research relevant to this endeavor. Whether the decision is in the public or private domain, the central economic concept in planning and financing education is the rate of return to the investment. This concept has a firm foundation in economic theory; it is applicable to both private and public allocative decisions; in practical economic affairs, it is widely used and understood, and as noted at the outset of this chapter, it leads to an efficient allocation when investments are made in accordance with the priorities set by the relative rates of return on alternative investment opportunities.

There is a rate of return profile that characterizes U.S. education. Higher education in general is in line with the rate of return on investment in the economy taken in its entirety. High school and the quality component in schooling rank higher by this test and elementary schooling is at the top in its rate of return. The main features of the available evidence can best be summarized by presenting these rate of return estimates. Qualifications and inferences will be deferred. Since we shall use the rate of return that the U. S. economy reveals, as the standard against which the returns to various classes of education are to be compared, we begin with it. The estimates that follow are all in terms of *rates of return.*

U. S. Economy, Upwards Toward 15. The implicit rate of return for the U. S. private domestic economy ranges between 10 and 15 percent. These are annual rates after profit taxes, but before personal taxes. They will serve as a bench mark in using the rates that follow as allocative guides.[16]

Elementary Grades, 35 and Higher. My estimate made a decade ago, admittedly very rough, places the rate of return to elementary schooling at about 35 percent.[17] Hanoch's estimates of the private rates using 1960 census data are in his language, "extremely high in most cases," mostly above 100 percent, highest for the 5-7 years of schooling, less for the 8 and for the 0-4 years, viewed as virtually no schooling.[18]

High School, About 25. High school graduates in Becker's study, restricted to white males, after personal taxes, shows a private rate of return rising from 16 percent in 1939 to 28 percent in 1958, and the indication is that it has probably been slightly higher since then.[19]

Quality of Schooling, About 25. The rate of return on the investment required to improve the quality of schooling in rural farm areas in the United States (elementary and high school) is estimated at 27 percent. When restricted to the internal rate of return to the expenditure on teachers' salaries as the means of improving the quality of schooling, the range is between 23 and 26 percent.[20]

Nonwhite, Rate of Return Depressed. The rates of return to the education of nonwhites, South and North, show less stability than the estimates for whites, and in general, the estimated rates are lower.[21] As already noted, labor market discrimination enters here.

College, About 15. Unlike the upward trend in the rate of return to high school graduates, college graduates have been earning over the same period in the neighborhood of 15 percent. This is the estimate drawn from Becker's study which is restricted to white males after personal taxes (see Table 2-5).

Graduate Instruction and Research, About 15. In estimating the rate of return on the graduate work much depends on how one treats the stipends that are awarded to graduate students. Treating them as earnings, for which a very plausible case can be made, the rate of return to graduate work is in the neighborhood of 15 percent.[22]

In interpreting the above estimates for education, it must be kept in mind that they are *private* rates of return, not *social*

TABLE 2-5
ESTIMATES OF PRIVATE RATES OF RETURN, UNITED STATES

Year	*High School Graduates: White Males after Personal Taxes (%)** (1)	*College Graduates: White Males after Personal Taxes (%)** (2)	*Corporate Manufacturing after Profit Taxes but before Personal Taxes (%)*** (3)	*U. S. Private Domestic Economy: Implicit Rate of Return after Profit Taxes but before Personal Taxes (%)**** (4)
1939	16	14.5		—
1949	20	13.+		12.6
1956	25	12.4	7.0 (for period 1947-57)	14.4 (1955-56)
1958	28	14.8		12.3 (1957-58)
1959	Slightly higher than in 1958			9.7
1961	Slightly higher than in 1958			11.2 (1960-61)
1963-65	—	—		13.3

*From Becker (1964a), p. 128.
**Also from Becker (1964a), in which he draws on a study by G. J. Stigler (see p. 115 and n. 2).
***From Jorgenson and Griliches (1967), p. 268.
SOURCE: T. W. Schultz, "Resources for Higher Education: An Economist's View," *Journal of Political Economy*, vol. 76, no. ___ Chicago: University of Chicago Press, (May/June, 1968).

rates; most of them are for white males. They are returns after personal taxes in Becker's study. The returns include only the earnings from the particular schooling; thus, the future satisfactions that accrue to the student are not taken into account. The *earnings* profiles estimates by Hanoch[23] are the best now available. The estimates of educational costs are not in good repair mainly because of changes in earnings foregone which have received inadequate attention.[24] Recent work by Mincer shows that the amount and value of the adult training (on-the-job, etc.) that a person acquires after he enters the labor force depends strongly upon the quantity (quality, too) of his education, but no part of this component is here credited to the education.

There are difficulties aplenty in estimating the social rates of return that would be the counterparts of the private rates of return presented above. Becker's perceptions of the "Social Productivity Gains" from college suggest that the social and private rates may be quite similar.[25] Hansen's estimates for "Total Resource Investment in Schooling" are in general similar to his private rates after taxes.[26] Except for qualifications to be noted later, it seems probable that the magnitudes and the profile of the social rates of return are in general similar to the private rates.

Turning now to the inferences to be drawn from these estimates, the inequalities in these rates of return within the educational enterprise strongly imply that a substantial reallocation of resources is called for. Consider the extreme difference that these estimates reveal between the elementary grades and higher education (college and graduate work), along with the fact that expenditures of public funds on elementary schooling tend to reduce the inequality in the distribution of income,[27] whereas public funds as they are presently used in higher education tend to increase the inequality in the distribution of personal income.[28] Therefore, both on economic efficiency and welfare grounds, a reallocation of public resources in favor of elementary schools is strongly indicated. But since these estimates are admittedly subject to many qualifications, are they even approximately correct? The answer is in the affirmative because they are broadly consistent with other evidence.

The economic inference at this point is that not enough has been spent on elementary schooling relative to that spent on higher education. But school administrators, members of school boards, and public officials, may look upon the difference in these estimates, regardless of how large the difference between them, as academic. They know, of course, that every local school would prefer to shift as large a part of the cost of elementary schooling as possible to the state, or better still, to the federal government. But such shifts would merely substitute one source of public funds for another. They might contend that elementary school attendance is for all practical purposes universal within the United States. When it comes to investing more to accommodate the growth in enrollment, it is true that elementary school enrollment is leveling off while college enrollment is rising steeply. But even so, not all high school graduates who are qualified to enter college and who want to attend can presently be accommodated. Could it be that the economist ~~is~~ mislead by his estimates showing high rates of return to elementary schooling, in the sense that even though they are high, it is in the nature of elementary schooling that they would remain high? Economic thinking provides a strong negative reply. As a matter of fact, there are many ways of spending more on this or that part, that is, on each of the several inputs entering into elementary schooling. Moreover, the economist would point out that for each of these inputs there will be, in all probability, diminishing returns as more of it is brought into play, and that the objective should be to increase the use of each input to the point that the rate of return on it would be neither higher nor lower than that of the standard of the U. S. economy, say 15 percent.

Once we see the heterogeneity of elementary schooling, it will elucidate the investment opportunities. Parts of it are in good condition; for there are communities where the level of personal income is high, where the parents are well educated, and where the supply of women who have completed college is large. Underinvestment in elementary schooling is not characteristic of this part. On the other side of this ledger, there are many communities and situations where too few resources are allocated to elementary schooling. Among those that qualify, we have the following: (1) rural-farm communities where people are mostly poor, transport costs are large, schools are often small, and the salary of teachers unattractive; (2) communities in the rural South, many of them compounded by the racial issue and the poverty of Negroes; (3) some of the other nonwhite populations, e.g. Mexican-Americans, throughout the

Southwest; (4) the white population of parts of Appalachia and the Piedmont, the people who are left behind; and (5) masses of poor people crowded together in parts of the central cities that lack community stability, where schools are overcrowded, classes inordinately large, and where teaching is done under very adverse circumstances that make it difficult to attract and hold competent, experienced teachers. Thus, considered broadly, these are the parts of the elementary enterprise where underinvestment is most common.

Closely associated with the underinvestment in the elementary grades is the neglect of quality in schooling. It extends also into high school. The combination of school inputs and the amount of them that is required to move to an optimum quality of schooling is still highly speculative in the sense that it has not been subject to the measurement and analysis that is long overdue. Thus, one ventures the judgment with some evidence to support it that it is the competence of the teachers that matters most and that the salaries paid teachers is a critical factor in their recruitment.

The rate of return to high school has continued to rise notwithstanding the rapid expansion of high school enrollment measured in terms of the proportion of the youth of high school age in high schools. There is undoubtedly much room here also to improve the quality component, but its economic importance is not as clear and plausible as it is in what we see in the elementary grades.

The main inference from the rates of return to college and to graduate instruction and research is that they do not reveal the under-investment that comes through so clearly as we examine the elementary grades, high school, and the quality component in schooling. On the contrary, there are estimates that show the rate of returns to graduate instruction and research as low as 7 percent.[29] The fact, however, is that the number of earned degrees has continued to increase: between 1959-65 earned master's degrees rose 60 percent and doctoral degrees 75 percent. Thus, there is a puzzle which has led to a reexamination of these estimates. It turns out that the earnings foregone have been reduced substantially by the stipends that graduate students receive which have all the attributes of earnings rather than income transfers. The estimate (15 percent) reported above,[30] draws on the studies of Stafford,[31] and Weiss.[32]

It appears probable that there is concealed in the allocation of resources to higher education an income distribution effect that may raise serious welfare questions. In policy terms, it may be none too soon to change the financing of higher education so that it will be approximately neutral in its effects on the distribution of the personal income of individuals and families. Presently, however, it is probably increasing the inequality in the distribution of personal income.

Hansen and Weisbrod in their study of the State of California where they had ready access to the necessary data show unmistakably that public higher education in California is highly regressive.[33] Although the empirical issue is not as yet settled, it is time to ask: Why should these investments in higher education be made a gift to students? In the case of physical capital that is formed by public investment, it is normally not transferred to particular individuals as a gift. It would clearly simplify the allocative process and also serve important welfare goals if public investment in higher education were placed on the same footing. This particular welfare problem has led Hansen and Weisbrod to formulate a new approach to higher education finance; it is a proposal for financing higher education for Wisconsin.[34] The central thrust of the Hansen-Weisbrod proposal is that it would correct in large part the regressive effect of higher education on the distribution of personal income. The authors summarize their proposal as follows:

> This program calls for replacing the present system of state undergraduate education grants to *public institutions* with a system of state grants going directly to *students*. Public institutions would now derive their revenue from charging students the full costs of college instruction. However, much or all of this increase in tuition would be reimbursed by state grants to lower income students. These grants would be based on the ability to pay the costs of college by student-families.[35]

But in sharp contrast, we have the plea of the Carnegie Commission on Higher Education. They are for universal college education (though against universal attendance) under the banner of equality of educational opportunity. But they give no apparent assurance that the required vast increase in public funds would be neutral in its effect on the distribution of personal income. There are ways of financing higher education that, from the point of view of investment in human capital, are efficient and that are also approximately neutral in their effects on the distribution of personal income.

FOOTNOTES

1. T. W. Schultz. "Underinvestment in the Quality of Schooling: The Rural Farm Areas." *Increasing Understanding of Public Problems and Policies*. Chicago: Farm Foundation, 1964 (b).

2. T. Welch. "Education in Production." *Journal of Political Economy*. 74 (October, 1964), 465-75.

3. T. W. Schultz. "Institutions and the Rising Economic Value of Man." *American Journal of Agricultural Economics*. 50 (December, 1968), 1113-22 (a).

4. T. W. Schultz. "Education and Economic Growth." *Social Forces Influencing American Education*, ed. Nelson B. Henry. Chicago: University of Chicago Press, 1961, 78-83.

5. Jacob Mincer. "On-the-Job Training: Costs, Returns and Some Duplications." *Journal of Political Economy*. 70, Supplement (October, 1962), 50-79 (a).

6. T. W. Schultz. "Our Welfare State and the Welfare of Farm People." *Social Service Review*. 38 no. 2 (June, 1964), 123-29 (a).

7. See Glen G. Cain. *Married Women in the Labor Force*. Chicago: University of Chicago Press 1966 and Jacob Mincer, "Labor Force Participation of Married Women." *Aspects of Labor Economics*, ed. H. Gregg Lewis, Princeton, New Jersey: Princeton University Press, 1962 (b).

8. See T. Welch. "Determinants of the Return to Schooling in Rural Farm Areas, 1959." Ph.D. dissertation, University of Chicago, 1966 (a) and T. Welch. "Measurement of the Quality of Schooling." *American Economics Review*, 56 no. 2 (May, 1966), 379-92 (b).

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10. Gary S. Becker. *The Economics of Discrimination*. Chicago: University of Chicago Press, 1957.

11. T. Welch. "Labor Market Discrimination: An Interpretation of Income Differences in the Rural South." *Journal of Political Economy*, 75 (June, 1967), 225-40.

12. Welch, 1967, 239-40.

13. T. W. Schultz, "Resources for Higher Education: An Economists View." 76 (June, 1968) (b).

14. E. G. Mect, "Private versus Public Education." *Journal of Political Economy*. 74 (October, 1964), 465-75.

15. Schultz, 1968 (b), p. 342.

16. See D. W. Jorgenson and Z. Grilliches. "The Expansion of Productivity Change." *Review of Economic Studies*. 34 (July, 1967), 249-83 and Table 2-5, Colum 4.

17. Schultz, 1961.

18. See Giora Hanoch. "Personal Earnings and Investment in Schooling." Ph.D. dissertation, University of Chicago, 1965; W. Lee Hansen. "Total and Private Rates of Return to Investment in Schooling." *Journal of Political Economy*. 71 (April, 1963), 128-40 and Giora Hanoch. "An Economic Analysis of Earnings and Schooling." *Journal of Human Resources* 2 no. 3 (Madison: University of Wisconsin Press, 1967), 310-29.

19. Gary S. Becker. *Human Capital*. New York: Columbia University Press, 1964.

20. Welch, 1966 (a).

21. Becker, 1964 and Hanoch, 1967.

22. T. W. Schultz, *Investment in Human Capital*, Chapter 7. New York: Free Press, 1970.

23. Hanoch, 1965.

24. Schultz, 1970.

25. Becker, 1964, *op. cit.*, 117-21.
26. Hansen, 1963, Table 3.
27. Barry R. Chiswick. "Human Capital and the Distribution of Personal Income by Regions." Ph.D. dissertation, Columbia University, 1967.
28. See Hansen and Weisbrod, 1969, and Douglas M. Windham. *Education, Equality and Income Distribution.* Lexington, Mass.: D. C. Heath, 1970.
29. Hanoch, 1965 and 1967.
30. Schultz, 1970.
31. Frank P. Stafford. "Graduate Student Income and Consumption." Ph.D. dissertation, University of Chicago, 1968.
32. Yorman Weiss. "Allocation of Time and Occupational Choice." Ph.D. dissertation, Stanford University, 1968.
33. Hansen and Weisbrod, 1969.
34. Hansen and Weisbrod, 1970.
35. *Ibid.*

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CHAPTER 3

The Social and Economic Externalities of Education

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As is the case with any social problem, democracies face the hard task of maintaining an appropriate division of functions between government and other forms of association. In the case of education, the family is most significant. Primary and secondary education still is provided, in the United States at least, in such a way that families organized in the smallest relevant units of our federal political structure—the local school district—make the most important decisions.

This essentially political structure for providing education was determined well over a century ago both in the spirit and tradition of individualism. Each community, in providing the resources for the education of its own children, must have felt that outcomes of its decisions were of no substantive consequence or relevance to outsiders.

While the conditions of economic and social independence never were realized fully, isolation and self-determination may not have been far from the fact a century or more ago. In modern social and economic settings, however, these conditions are less evident than ever before. The modern political-fiscal system is characterized by specialization of economic activity, by ease of mobility, by advancement of urbanization, and by rapid growth of industrialization. All of these characteristics mean greater and greater human interdependence—both economically and socially.

Where once the necessity for order of a large measure of like-mindedness was community wide, now it is more and more intercommunity in purview. Increased population, increased urbanization, and improved transportation all serve to bring people closer together, promote specialization of economic activity, and increase economic and social interdependence. What once was a rational, carefully made decision by a school district now may be inconsistent with the social and economic interests of all those who are affected.

Economists do not, of course, deal with local school districts as if they were organisms capable of behavior. Economists do deal with individuals (or families) as decision-making units in both private and public choice, and economists proceed, initially, at least, on the assumption that their fundamental laws of behavior are the same under both sets of institutions.[2] On this basis, rational decentralized decisions may be inconsistent with social and economic interests of all those affected within the local school district itself as well as those beyond. A family's support for the education of its own child(ren), based on the expectation of returns, would disregard any returns or benefits conferred on families other than that of the educated.

The effects of decisions on the provision of education potentially permeate the entire society, which recognizes that education entails subsidiary as well as direct consequences. In the essay which follows, however, the market for education is not discussed thoroughly. The supply of education, for example, is ignored almost wholly. Even the demand for education is not covered exhaustively. The main thrust is the demand for the education of other people's children. The approach is to identify the benefits of education—particularly to persons other than the family of the educated—to describe on this basis the characteristics of education as a peculiar type of economic good, and to point out the implications for the financing of education.

THE BENEFITS OF EDUCATION

At birth, human beings have no capacity for conscious purposeful or intelligent action. The function of pair bonds in the evolution of *Homo sapiens* seems to be related to child rearing, thereby to species preservation. Open instinct—varying combination of genetic design and relevant experience—is common among all higher animal forms. Proceeding higher and higher in the animal orders, the open instinct incorporates more and more a learned position until, in man, it reaches a maximum of learning, a minimum of design. Man is large-brained because he thinks (and not the reverse) and because his survival depended on a maximum of learning, and his offspring—helpless and incapable alone of survival from birth until a relatively long period thereafter—depend on adults for the necessary relevant experience, learning, or education.

Consequently, education is a primary task of adult society, since children are not responsible members of society. In other words, the demand for education is almost certainly by parents (or guardians) on behalf of their children or on the behalf of other people's children.

Education self-evidently is not a free good—it abounded no more in nature during Miocene and Early Pliocene times than it does in this twentieth century of institutional primary, secondary, and university instruction. Resources that could be used to produce other things that are valued by men and women have to be employed to produce primary and secondary and university education. Education is, in short, an economic good.

To determine education's genre as an economic good, a consideration of the nature of its benefits is of some help. In the discussion which follows, the *private* benefits of education are those internal to the *family* of the educated, i.e., those which accrue only to the child or to his parents (or guardians)—the private rates of return discussed by Schultz in Chapter 2 above. The *external* benefits are those which contribute to the well-being of *families* other than that of the educated, even where it is infeasible to identify the families benefited or the money value of the benefits.

Private Benefits

Vocational and professional training are examples of a form of investment in human capital rather than such non-human capital as machinery and buildings. This is not to suggest that investment in human and investment in non-human capital are on a par with one another. Despite considerable evidence that the rate of return on much educational investment greatly exceeds that on investment in physical capital, there appears to be *underinvestment* in human capital because of an imperfection in the capital market, as Schultz has argued. A lender can get some security for his loan in the form of a residual claim to a physical asset itself, but, in a non-slave state, a lender cannot get any comparable security in making a loan to increase the earning power of a human being. Also, the productivity of human capital depends on the cooperation of the borrower, but the productivity of physical capital does not.[3]

The function of investment in human capital is to increase the economic productivity of the *individual* who is rewarded in turn by receiving a higher than otherwise return for his services. Of all of the benefits of education—at a risk of emphasizing unduly the investment aspects of education—the most important probably is the increased productivity and earnings of the educated, especially at the lower grades. By increasing the knowledge and skill of the educated, that is, education tends to increase potential earning.

Relating level of income to level of educational attainment shows an unmistakable positive effect on income. When differences due to other factors are taken into account—e.g., informal education in the home, social mobility, family wealth—persons with higher levels of educational attainment probably would have greater incomes than those with a lower level even without the additional schooling.[4] Even after adjustment for non-education variables affecting income, however, there is a consistent effect on income of an additional year of both primary and secondary education and of post-high school education.[5]

Perhaps this relationship between schooling and earnings has been overemphasized or even misconceived, however. For "low-achievers," one study has demonstrated that little of the variations in earnings is determined by schooling level and that even this vanishes when a measure of learning also is introduced. The point here is one usually taken for granted, viz., it is what one learns that influences earnings rather than the mere fact of spending time in class. Also, comparative payoffs to schooling and job training were shown to differ markedly, with training proving to be superior. Eleven years of schooling were found to be equivalent to the influence of *some* job training on earnings. At least for low achievers, schooling was a poor substitute for job training in producing higher earnings.[6]

Whatever the value of additional education, it may go beyond the discounted present value of additional earnings to include the value of the opportunity to obtain still further education or to take advantage of additional on-the-job training. The value of a high school education, for example, includes not only the potential additional earnings but the value of the opportunity to pursue a college education and to qualify for advanced on-the-job training as well. These opportunities must be valued according to the probability of being exercised and the expected value if exercised.[7] Weisbrod also includes the value of "non-monetary 'opportunity option,' involving the broadened individual employment choices which education permits" and the "opportunities for 'hedging' against the vicissitudes of technological change."[8]

Some of these *private* benefits of education are not even associated with the market at all. If the market benefits unduly emphasize the investment aspects of education, then the non-market benefits admittedly place heavy emphasis on the consumption aspects of education. Fundamentally, these non-market benefits involve the increased satisfaction in later years of past and continuing exposure to new ideas and cultural opportunities. Because of the quantification difficulties of measuring non-market or consumption aspects of education, however, studies typically ignore any benefits which are either not directly valued in the market or may not be at least indirectly measured through market counterparts.[9]

Although the principal objective of education obviously is the increased knowledge, skills, and non-market accruements of the educated, incidental by-products may be involved which are of value to other members of the family. For the mother of a school-age child(ren), for example, a valuable child-care service is provided which makes it possible for the mother either to seek employment or to engage in other activities.

Of the alternatives to engage in either market or non-market activities, a mother presumably chooses the most satisfying activity. For mothers who choose market alternatives, the measure of the productivity of the child-care services can be estimated by the difference between the value of a mother's output before and after her child(ren) enters school. For mothers who choose non-market alternatives, the value of child-care services typically is disregarded, although it certainly is greater than zero.

Members of the present and future family of the educated also may benefit incidentally. Siblings, particularly younger ones, will benefit by virtue of informal education and improved intellectual environment in the home, and, when the student matures and becomes a parent himself, his children will benefit similarly from his education. The presence and relevance of such education and environment are not denied, but no estimates have been made of their value.

Finally, the intergeneration nature of some of these benefits underscore the investment component of education, about which T. W. Schultz has argued the following point:

> The education of women . . . reduces the subsequent effective costs of education because of the critical role that mothers play in motivating their children to obtain an education and to perform well while they are attending school. Thus, if we could get at the factors underlying the perpetuation of education, it is likely that we would discover that the education of many persons not in the labor force contributes heavily to the effective perpetuation of the stock of education.[10]

EXTERNALITIES

Initially, externalities may be regarded as involving goods which, when consumed or produced, either confer benefits or impose costs on persons other than the consumer or producer. External benefits in consumption, for example, are benefits which contribute to the well-being of people other than the consumer himself. Goods and services which are characterized by sizable externalities are, of course, markedly different from purely private ones, the consumption of which neither imposes costs nor confers benefits on anyone else.[11] To the extent that one person's decisions either benefit or harm another without that person taking into account these external benefits or external costs, such decisions may lead to underprovision (in the case of external benefits) or overprovision (in the case of external costs) of certain activities (and to serious questions about equity) from the social point of view. If a firm uses a river as an open sewer to the point where the (additional) benefits to the firm are equivalent to the (additional) costs to the firm, there will be overprovision of polluted water when taking into account the costs imposed on downstream users. From a social point of view in this case, additional benefits should be equated with additional costs to the firm plus additional costs to anyone else.

Insofar as education is concerned, a family may be expected to favor expenditures on education until a level is reached where it expects the additional benefits to the family are roughly equivalent to additional costs. This puts a family into what may be called "private equilibrium," where expenditures have been extended until the expected private (marginal) benefits just equal expected (marginal) private costs.

Families other than that of the educated, however, also may benefit. If taken into account, consideration of all the benefits of education should lead to a level of expenditures beyond that associated with private equilibrium to what might be called "social equilibrium," where the additional benefits to all families in the society are roughly equivalent to additional costs. The grounds on which these external benefits of education might be based are discussed below.

External Benefits of Education

Families other than that of a student may benefit in at least two ways. First, education ultimately may affect the productivity of persons other than recipients, and it may affect expenditures on other services made necessary by a lack of education. This type of external benefit is economic in nature. Second, education may affect the acceptance of social values, and it may affect the feasibility of accomplishing social goals. These may be referred to as social externalities.

In practice, of course, sharp distinctions may prove difficult to draw between aspects of education which benefit only recipients and aspects which benefit others either economically or socially. Drawing a sharp line between economic and social externalities may prove equally difficult.

Economic Externalities

Production in modern, industrialized economies—where production of wealth is socialized, as Frank Knight put it[12]—requires coordination, cooperation, and other interaction of workers, so that the productivity of each worker potentially affects the productivity of every other worker. Additional education ultimately can improve the general environment within which production takes place, thereby having external effects on the productivity of others. For example, increased productivity of one worker may come through emulating a co-worker and learning his skills or through psychological and motivational factors resulting from work association with educated or more-educated co-workers.

Through the simple process of work association itself, workers may develop traits or properties which have personal, social, and economic impact. For example, to a degree usually associated with additional educational attainment, workers may improve communication and discipline of the mind, develop flexibility and adaptability, and learn reliability and maturity. Also, through the less simple process of transfer, educated or more-educated workers may contribute to the awareness of or the reception to present knowledge and new ideas.[13] On this point, Edward Denison has commented that there is no doubt that increased education of executives and ordinary workers has facilitated both the recognition of improved practices and the speed of incorporating them into the productive process.[14] Also, Weisbrod has argued that employers have an interest in schooling and training of their employees because "[m]uch of education improves the quality of the labor force and thereby bestows some benefits to employers insofar as market imperfection or the specific nature of the education[15] result in failure of the employer to pay the worker his full [contribution to production]."[16]

Apart from employees and employers, taxpayers (and victims) pay for many of the consequences of the lack of education. Over time, education and the presence of educated persons in a community can lead to lower (than otherwise) costs of preventing and combatting crime and delinquency as well as lower (than otherwise) welfare costs. Insofar as lack of education leads to unemployment and crime—and these may not be unrelated—the need for relieving the consequences of these problems may not be as great. Resources released for alternative private and public uses are of potential benefit to all taxpayers.

Also, Weisbrod has pointed out that families other than that of the educated may benefit to the extent that educated people pay higher taxes. In his words,

> If it is assumed that consumption of public services is not a positive function of one's level of income and education, but that tax payments are, then it is clear that by raising the incomes of some people the tax burden upon

others may be reduced. Of course, it may be true that better educated, higher income people actually consume less public services, or possibly more. Insofar as police efforts are devoted toward thieves, juvenile delinquents, and the like, eventual reductions in these costs might be expected if education and income levels of the lowest groups could be raised. On the other hand, better educated people may consume more of such services as the public library.[17]

Social Externalities

Beyond raising productivity and bringing greater returns to both the educated and to the less-educated co-worker, education also may serve to promote non-economic ends. For one thing, democracy is hardly feasible without widespread acceptance of a common set of values and without some minimum degree of citizen literacy and knowledge. Education is one means of inculcating in children generally accepted social values and behavior norms.

Education is not only a means of promoting a minimum standard of citizenship. It is also a means of helping to preserve and even to enlarge the cultural heritage of a community or country. To the extent that these external benefits improve the functioning of political democracy, democratic institutions are strengthened in the process. This feature of education has led Milton Friedman to comment as follows:

> In consequence, the gain from the education of a child accrues not only to the child or to his parents but to other members of the society; the education of my child contributes to other people's welfare by promoting a stable and democratic society. Yet it is not feasible to identify the particular individuals (or families) benefited or the money value of the benefit and so to charge for the services rendered. There is therefore a significant "neighborhood effect."[18]

Education also is important in promoting equality of opportunity. If education is successful in lowering financial and other barriers to entry into previously privileged positions, then education provides a return in the form of satisfying a social goal over and above the private returns to the recipients of education.[19] For that matter, for lack of education or skills, the solution may be found in removing economic and other barriers to education and training *themselves,* as well as in removing, as in the case of minority groups, certain social barriers to improvement in economic position.[20] Coleman emphasized this aspect of education in stating a desirable objective for special policy:

> From the perspective of society, it assumes that what is important is not to "equalize the schools" in some formal sense, but to insure that children from all groups come into adult society so equipped as to insure their full participation in this society.
>
> Another way of putting this is to say that the schools are successful only insofar as they reduce the dependence of a child's opportunities upon his social origins. We can think of a set of conditional probabilities: the probability of being prepared for a given occupation or for a given college at the end of high school, conditional upon the child's social origins. The effectiveness of the schools consists, in part, of making the conditional probabilities less conditional—that is, less dependent upon social origins. Thus, equality of educational opportunity implies, not merely "equal" schools, but equally effective schools, whose influences will overcome the difference in starting point of children from different social groups.[21]

Sir John Hicks recently has implied the same role for state education in lamenting the failures of market provision of education, at least insofar as equality of opportunity is concerned:

> The passage from one [class structure] to another is largely a matter of training; and training is a process with which the free labour market does not readily cope. Education is a service which the market will provide for those who are willing to pay for it; but education, provided in that way, simply acts as a means by which those who are in the higher [class structures] hand on their privileges to their children. (The tendency of an educational system to work in that manner had of course been tempered, even before the days of State education, by charitable endowments.)[22]

Most of the concern in recent years has been devoted to these social external benefits of education. For that reason, most of the following discussion is devoted to, as "shorthand," providing a minimum standard of citizenship for each child.

EXTERNALITIES AND RESOURCE ALLOCATION

Whether it be water pollution or smog (cases of external cost and overprovision), education, or whatever, the whole question of externalities is that of possible effects of the consumption or production of given items upon persons other than the parties to the exchange. Without some kind of adjustment—prohibition, directive, bribery, merger, taxes and subsidies, regulation, etc.—the economy may overprovide (in the case of external costs) or underprovide (in the case of external benefits) goods or activities characterized by externality.[23]

The characteristics of education as an economic good, for example, indicate that its benefits contribute not only to the well-being of the student and his family but to other people as well. This externality aspect of education is important from two different considerations. To the extent that the benefit principle of taxation[24] governs the distribution of the cost of education among individuals, costs should be borne by those who enjoy the benefits of education. This equity consideration suggests that external beneficiaries ought to share with the student's family in the financial burden of providing education. Second, efficiency consideration for resource allocation suggests that underprovision of education will result if external benefits are disregarded.

The problem of socially efficient and socially equitable provision of education are then twofold. First, some adjustment must be made to extend expenditures beyond the suboptimal level associated with equating private (marginal) benefits and private (marginal) costs to a level approximating that associated with equating social, i.e., private (marginal) plus external (marginal) benefits, and social (marginal) costs. Second, some means must be applied to distribute the costs of the optimal level of education expenditures according to commonly embraced norms of social justice.

The traditional solutions for efficient provision of goods characterized by external benefits are (1) to establish minimum standards of performance, (2) to subsidize the producer or consumer of the good, or (3) to enlarge the decision making unit so as to "internalize" the benefits.[25] If provision were left to private choice, the good would be underprovided from the social point of view, but minimum standards might be imposed which require consumers to purchase quantities larger than they would if left to their own choice. On the other hand, a subsidy to, say, the consumer would reduce the cost or price of the good, and we could expect more of the good to be purchased. Finally, internalization would mean increasing the size of a decision-making unit until it succeeds in capturing all the benefits rather than only some of them.

Minimum Standards

Suppose that education were provided privately and that families consequently could purchase any quantity of education they choose. One family may purchase two student-years of education, another eight, and still another ten. Each family presumably would be in private equilibrium as discussed above. But education would be underprovided if, socially, most or all agreed that twelve student-years of education (per child) are necessary to provide a minimum standard of citizenship. How do we extend the provision from a level of underprovision to the level where all families provide each of their children with the socially desirable twelve student-years of education? One solution simply may be to *require* each child to receive a minimum of twelve student-years of education. Some kind of subsidy almost certainly must be involved here, however. As Milton Friedman has put it:

> What kind of government action is justified . . .? The most obvious is to require that each child receive a minimum amount of education of a specified kind. Such a requirement could be imposed upon the parents without further government action, just as owners of buildings, and frequently of automobiles, are required to adhere to specified standards to protect the safety of others. There is, however, a difference between the two cases. In the latter, individuals who cannot pay the costs of meeting the required standards can generally divest themselves of the property in question by selling it to others who can, so the requirement can readily be enforced without government subsidy. . . . The separation of a child from a parent who cannot pay for the minimum required education is clearly inconsistent with our reliance on the family as the basic social unit and our belief in the freedom of the individual.[26]

Minimum standards go hand in hand with subsidies in the case of education, and, for that matter, subsidies go hand in hand with minimum standards. Subsidies would make no sense, in other words, unless they were applied with some objective, some standard, in mind. The questions of the tax base to support the subsidy and the level of government from which the subsidy should come still must be resolved.

Subsidies

The idea behind the use of subsidies in dealing with the under provision of goods characterized by external benefits is to reduce the cost of such goods to consumers and thereby to increase their consumption of such goods. By reducing the cost of a unit of education, for example, families may respond by consuming a larger quantity than otherwise. Of course, the property tax (and, to a lesser extent, the sales tax) already is used to subsidize education. Granted that education is provided by local public schools and that property is the local tax base, we can expect families to acquiesce in the level of property taxes until families feel that further tax costs to them would exceed the additional benefits to them.[27] And granted that families make political choices on the basis of their awareness or consciousness of costs and benefits, any further extension of spending must, if subsidies are to be used, be financed by subsidies tied to a base other than property.

The "taxpayers' revolution" seems to feed on the fact that each taxpayer's proportion of the tax base is relatively sizeable and that each taxpayer is relatively aware of the influence which additional educational expenditures have on his personal tax bill. Given traditional revenue patterns among the several levels of government in federal systems, subsidies tied to the property tax base at local levels of government, at the risk of tautology, will engender the most resistance to increases beyond private equilibrium; subsidies tied to the sales tax base at state levels of government will involve some acquiescence; and subsidies tied to the income tax base at the federal level of government will lead to still more acquiescence. In other words, the more the cost of subsidies can be distributed on the grounds of a tax base for which each family's contribution is relatively small, the more citizens may be uncertain as to the extent to which, if any, their tax bills will be reduced if they oppose further spending on education. This may be thought of as a "free rider problem" in reverse in the sense that a dilution of individual proportion of the tax base leads to elements of indirection and uncertainty on the tax side analogous to the elements of indirection and uncertainty at least of the public component (cf. *infra*) of education on the expenditure side.

The property base may serve very well as a means of providing families organized in local school districts with an amount of education commensurate with their ideas about the benefits to them. Extension of education expenditures beyond the level for which families judge the additional benefits to them to be equal to the additional costs to them must depend on subsidies from a level of government for which the taxpayer's proportion of the tax base is as relatively small as his "share" of the public benefits of education themselves.[28] This calls for the use of the income (federal) base and sales (state) base to gain acquiescence in extending the provision of education beyond the level to which families consent through the property base. Although based largely on efficiency grounds, this conclusion might be defended on equity grounds as well along lines that, if the spillover of benefits are statewide or national in scope, then statewide or national tax bases ought to support such expenditures.

Another issue in the use of subsidies is that the type of subsidies used to reduce the cost or price of education will, of course, influence the type of education pursued. Market-type or voucher-type subsidies to students either in the form of cheap tuition to all students or loans at subsidized rates of interest tend to give the maximum weight to private benefits and to private demand. Investment would tend to be expended most where the private incentives are highest. Across-the-board subsidies may not prove to be a good method of obtaining improvement in citizenship quality, for example.

Also, some courses of education are more effective than others in improving citizenship quality, for example; so that it may be desirable in subsidizing education for this reason to be selective in choosing the supported areas of study, even if this puts a constraint on "consumer sovereignty." If education for improvement in citizenship quality is related positively to level of education as such, the ablest as well as the middle- and upper-income youths of lesser ability will obtain more politically relevant education than others in the absence of subsidies.

This may be an argument for weighting subsidies in favor of less able students and lower-income youths, especially if more time and effort are required to attain the desired level of citizenship standards. For that matter, "[a] subsidized educational program for majority voting [might] be aimed at some of the very youths who would be most likely to drop out, and thus it would seem plausible to offer cash support in addition to free tuition in order to induce students to finish the program."[29]

In any event, the form of the subsidy itself may influence the allocation of resources to education. To reiterate, families make political choices on the basis of their awareness or consciousness of costs and benefits. Consider outlay on education. Suppose a community considers two alternative ways of subsidizing education: (1) subsidize the producers of education—analogous to the standard form of directly operated public schools at a reduced cost or even at zero cost to consumers—and (2) subsidize the consumers—analogous to "market-type" solutions in the sense that families with school-age children would be provided with tuition vouchers or grants which might be used to purchase either public or private education. In each case, we may assume that the property tax is used to defray the costs of the subsidy.

For families with school-age children, the voucher plan would tend to make educational expenditures more directly linked between recipient and government, and those families may choose to spend more collectively under this plan than under the alternative one. For other families, the benefits may seem more remote than ever, since obviously concentrated directly on specific beneficiaries other than themselves, and thereby choose to spend less collectively under this plan than under the other one.[30]

Internalization

The very word "externality" seems to lead naturally if not logically to "internalization" as a solution to efficient provision. In other words, if some benefits remain outside when decisions are made by an individual or group, then can't we bring those benefits inside if we increase the size of the decision-making unit from an individual to a group or from a group to an even larger group? In and of itself, enlarging the decision-making unit until its size corresponds with the spillover of benefits may not be effective. A family organized in a large school district will be no more willing to extend expenditures beyond private equilibrium than it was in a small school district. This is because the external benefits are external to the *family,* and "internalization" thereby makes no sense; we cannot increase the size of the *family* until it is large enough to "capture" all of the benefits of education!

The internalization confusion results generally from inarticulate distinctions between externalities and public components and specifically here of misconceiving geographic spillovers as externalities. Actually, an externality involves a case where two or more products are produced in the same process (e.g., apples and nectar), where *each product is private* (i.e., where consumption by one person diminishes the amount available for consumption by others), and where at least one product is characterized by the *infeasibility of excluding* from consumption persons who do not pay. In other words, externalities involve more or less direct, private effects which are not priced and which one person or firm imposes or confers on another person or firm. In cases involving firms, "market failure" may be avoided by internalization.[31] Cases involving geographic spillovers and public components are not cases of externality and hence not subject to solution by internalization.

GEOGRAPHIC SPILLOVERS

Earlier, the point was raised that education may bring benefits to people other than the student and his family. A distinction was made between private benefits—those which contribute to the child's or his parents' welfare—and external benefits—those which contribute to other people's welfare. Major studies by Weisbrod[32] and Hirsch, et al.,[33] have been based on the idea that education may bring benefits to people other than those in the school district which provides the education. Weisbrod, for example, makes the following comment:

> Thus, we shall distinguish between those benefits which accrue inside the school district—internal benefits—and those which accrue to persons outside the district—external benefits. These latter geographically externalized benefits are termed "spillovers."[34]

In short, therefore, a distinction is made between benefits which accrue to persons inside the school district—internal benefits—and benefits which accrue to persons outside the district—external benefits. Efficient (and equitable) provision of education under these circumstances is impeded, according to the Weisbrod-Hirsch-et al. studies, because some of the returns to investment in human capital are not "captured" by the investing community.

According to these studies, a community, realizing that some of the benefits of education are reaped by outsiders, may fail to undertake expenditures which would be desirable from the whole social point of view. For example, a community might not devote $1,000 of resources to produce an output worth $800 to it even though the output were also worth another $500 to outsiders, the result being that a $1,000 expenditure worth $1,300 in benefits might not be made.

The approach of these studies is concerned primarily with the extent to which a community suffers when persons it has educated leave and the extent to which a community gains when persons educated elsewhere move in. Greater income is received by the educated, for example, and, if they leave the community, they take their increased incomes (generated by the education) with them. A community expecting out-migration will tend to underinvest in education.

Weisbrod, in particular, argues that global underinvestment occurs because "spill-in" benefits may not serve to offset the effects of the "spill-out" benefits on the decisions of local authorities. In his words:

> While spill-outs of benefits tend to diminish expenditures from their optimal level, spill-ins may not bring opposite results. The result is this: to some extent, a community is to the nation what a purely competitive firm is to the industry; thus, the spill-ins (or imports) of benefits to a community from education provided elsewhere may be largely independent of its own education expenditures. To the extent that they are, the spill-ins constitute fixed benefits; as such they will have no influence on decisions at the margin. . . .[35]

Hirsch, et al., disagreed in arguing that, if applied to costs as well as benefits, the Weisbrod case "leads to a conclusion of underinvestment in some instances, and to overinvestment in others."[36]

A problem with this approach is that no externality is involved. A "spillover" is simply, "a geographical concept involving only one service at a time, a service—or disservice—rendered over an area only part of which is within the boundaries of a political group, that is, within the boundaries of the governmental unit that decides upon and dispenses the service."[37]

The problem of geographic spillovers and of federalism itself does add to the problem of providing education. Every citizen in the nation has *some* interest in the quantity and quality of education provided in every local community in the nation. But the interest of a citizen of North Carolina in the education services in California may be slight; his interest in services in South Carolina much greater. Regardless, federalism or geographic spillover serves to make interest less by drawing geographic distinctions which serve to make the benefits seem more remote, and federalism, dividing responsibilities and sovereignty among myriad units of government, makes interference in the decisions of others more difficult, even where one group of citizens has a strong interest in seeing that children in another state or locality are educated better than they are being educated.[38]

Families demanding education on behalf of their own children, however, are not likely to underinvest in education because of an expectation that their children will settle eventually outside the community. Families with no children currently enrolled and, for that matter, families with children currently enrolled may underinvest in education—but not because of externality. The problematical characteristic of education—what sets it apart from merely a private consumption or investment good—is that consumption of some of its benefits is non-competing, i.e., the consumption of part of the benefits does not diminish the amount available for consumption by others. This characteristic of education, missed entirely by the geographic-spillover approach, is a "public component" of education.

THE PUBLIC COMPONENT OF EDUCATION

Externalities were regarded initially as involving goods which, when consumed or produced, either confer benefits or impose costs on persons other than the consumer or producer. This definition is far too inclusive, in the sense that it includes different effects with different characteristics and problems. The point overlooked in the initial treatment of the externalities of education is that the enjoyment of the external benefits of education by one person does not diminish the opportunity of others to enjoy those same benefits. Put another way, families other than the educated must adjust to the same quantity—any change in quantity for one person is a change for all.

Imagine for a moment that education is provided privately, that individuals and families can purchase any number of student-years of education they choose, and that, if left to satisfying private demand, a student or his family would choose only eight student-years of education. Because of other families' interest in a minimum standard of citizenship, they want every student to get at least twelve student-years of education. Imagine further that any subsidies must come from voluntary contributions. Each family then may reason as follows: our contribution is a negligible part of the total amount if everyone else contributes, so the additional student-years of education will be almost the same, and we will have saved the amount of our contribution. On the other hand, if we contribute and no other families do, there will not be a noticeable increase in education, and we will be out the money contributed. Consequently, each family may decide that it will be better off, no matter what other people do, if it does not contribute!

This kind of dilemma would not occur were it not that, if a family did provide additional education, those additional student-years of education may serve to satisfy that family's demand and other's as well. The difficulty of providing the socially optimal amount of education lies in the problem that families may conceal their evaluation of benefits received and thereby refuse to make contributions or oppose taxes for this purpose, while at the same time receiving benefits from the education of other people's children.

There simply is no means short of omniscience which can determine accurately the quantity of education which is demanded over and above that which would be privately demanded, and yet the efficient provision of education hinges directly on coping somehow with this problem. Any "solution" which results in making families further adjust to the same quantity or adds to the incentive to conceal their demand will add to the problem of the public component. A bona fide solution must take the form of promoting acquiescence in revealing demand.

Minimum standards of performance which have the effect of making quantity (or quality) adjustments more difficult also may have the effect of adding something analogous to a public component even to the private aspect of the good. If all families are required to consume the same number of student-years of education per child, for example, then they may conceal their evaluation of education in an effort to acquire a truly preferred quantity at a bargain price.

In other words, when minimum standards of performance are used along with subsidies, the effect may be to provide an incentive to families to conceal even their true private demand for education. To the extent that this is the case, local, state, or federal subsidies to education may have to be used to satisfy the private aspects of demand, also. In some ways, this provides an explanation as to why we provide education "free" even though it is characterized by sizable private features. It also may suggest that property taxes may be resisted even in reaching what has been regarded above as a local equilibrium.

CONCLUDING REMARKS

Many—but not all—of the benefits of education accrue to a student and his family. External from the family of a student are benefits to others in the form of, for example, favorable effects on the productivity of others, reduction of resources allocated to compensate for a lack of education, provision of a minimum standard of citizenship, and promotion of equality of opportunity.

From the social point of view, education will be underprovided if expenditures are extended until the additional costs are equal to only the additional benefits to the family of the student. The social problem is to adjust the level of underprovision until education spending reaches the point where additional costs are equal to all of the additional benefits, including those to the family of the student *and* to other families as well.

This leads to the use of minimum standards of performance and subsidies as means of avoiding the underprovision of education. In turn, this requires settlement on the minimum quantity and quality of education and on a mix of subsidies as well.

The effect of bringing educational attainments *throughout the nation* closer to social norms may be, in and of itself, to require federal financial involvement. Because of interarea differences in fiscal capacity, in other words, some financial transfers—facilitated, presumably, by means of the federal level of government—may be required to avoid great financial burdens imposed on low-income areas.

The problem of promoting acquiescence in providing the socially optimal quantity and quality of education is not an easy one. In the first place, use of the property base may not succeed in even reaching a private equilibrium (as defined *supra*). Families organized locally may resist property taxes, for which each is relatively aware of the nexus between local educational spending and his tax-bill, in anticipation of state or federal aid defrayed by either sales or income taxation, for which the nexus is less obvious. Families may participate in a taxpayers' revolution even before a private equilibrium is reached or before social norms are satisfied if they hope to receive, as a result, state or federal aid to education which serves to either supplement or replace local property taxes.

Even if a private equilibrium were reached locally through the property base, there may prove to be difficulty in reaching state or national equilibrium. The threat of overprovision may be as great as underprovision. If each family's proportion of the sales and income bases are so insignificant that subsidies from such sources appear to be "free," then families may vote to extend education expenditures until they perceive (marginal) benefits to be equal to zero, their perception of (marginal) cost.

In any event, the state or federal subsidies need not be of the across-the-board type, especially if the thrust is to satisfy the interests of families other than that of the educated. Some courses of education are more effective than others in developing good citizenship and reducing barriers, for example. To the extent that this is the case, subsidies in order to be most effective themselves in accomplishing intentions may have to be earmarked for particular programs of study and development or tied to minimum standards of performance.

When dealing with externalities (or with public components), one is struck by the menu of policies which can be fashioned to deal with the problems of overprovision or underprovision. Policies must be designed with particular cases in mind, and the policy selected may involve both benefits *and costs*. Thus, providing for a hedge against underprovision of education also may include the threat of overprovision. Providing for a hedge against the local freedom not to act on improving schools may include at the same time the threat of diminished local freedom to act. Such questions involve a number of philosophical issues and value judgments, not many of which can be resolved by economists *qua* economists.

FOOTNOTES

1. The author would like to thank his best friend and critic, Charles W. Meyer, for his usual help and encouragement.

2. The use of a highly rationalistic model does not imply that families actually or consciously weigh the costs and benefits of education but rather that families behave *as if* they do. Cf. James M. Buchanan, *The Demand and Supply of Public Goods* (Chicago: Rand McNally, 1968), pp. 1-10; and, for an analysis of the political process in terms of cost-benefit analysis, cf. Anthony Downs, *An Economic Theory of Democracy* (New York: Harper and Brothers, 1957), and James M. Buchanan and Gordon Tullock, *The Calculus of Consent* (Ann Arbor: University of Michigan Press, 1962).

3. Cf. Milton Friedman, "The Role of Government in Education," *Economics and the Public Interest*, ed. Robert A. Solo (New Brunswick, N.J.: Rutgers University Press, 1955), pp. 135-39.

4. Cf. D. S. Bridgemand, "Problems in Estimating the Monetary Value of College Education," *Review of Economics and Statistics, Supplement*, 42 (August 1960), 181.

5. Cf. Dael Wolfle, "Economics and Educational Value," *Review of Economics and Statistics, Supplement*, 42 (August 1960), 178-79.

6. W. Lee Hansen, Burton A. Weisbrod, and William J. Scanlon, *Determinants of Earnings: Does Schooling Really Count?* (Madison, Wisc.: Institute for Research on Poverty, 1968).

7. Cf. Burton A. Weisbrod, *External Benefits of Public Education* (Princeton, N.J.: Industrial Relations Section of Princeton University, 1964), pp. 18-24, and Jacob Mincer, "On-the-job Training: Costs, Returns, and Some Implications," *Journal of Political Economy, Supplement*, 70 (October 1962), 50-79.

8. Weisbrod, p. 17.

9. Cf. Werner Z. Hirsch, Elbert W. Segelhorst, and Morton J. Marcus, *Spillover of Education Costs and Benefits* (Los Angeles: Institute of Government and Public Affairs of U.C.L.A., 1964), p. 317.

10. T. W. Shultz, "Education and Economic Growth," *Social Factors Influencing American Education* (Chicago: National Society for the Study of Education, 1961), pp. 74-75.

11. For further discussion of public goods, merit goods, and externalities, cf. J. Ronnie Davis, Joe R. Hulett, and Charles W. Meyer, "The Characteristics of Public Goods, Merit Goods, and Externalities," mimeographed.

12. Frank H. Knight, *The Economic Organization* (New York: Harper and Row, 1965), p. 11.

13. Cf. Hirsch, et al., p. 336.

14. Cf. Edward F. Denison, *The Sources of Economic Growth in the United States and the Alternatives Before Us*, Supplementary Paper No. 13 (New York: Committee for Economic Development, 1962).

15. "Specific" training raises a worker's (marginal) productivity more in one firm than in other firms. Wage rates are determined by a worker's (marginal) productivity in alternative firms. Cf. Gary S. Becker, "Investment in Human Capital: A Theoretical Analysis," *Journal of Political Economy, Supplement*, 70 (October 1962), 9-49.

16. Weisbrod, p. 32.

17. Weisbrod, p. 43.

18. Friedman, p. 125.

19. Although the extension of primary, secondary, and college education is recognized widely to confer social and political benefits to all of society, there is relatively little in the way of empirical testing of the notion. What little testing which has been done on the relationship between education and citizenship quality does give support to the view. Cf. V. O. Key, Jr., *Public Opinion and American Democracy* (New York: Alfred A. Knopf, 1961), pp. 324-25, and Angus Cambell, Gerald Gurin, and Warren Miller, *The Voter Decides* (White Plains, N.Y.: Row Peterson and Co., 1954), pp. 194-99.

20. Cf. the testimony of Dewey Anderson, U. S. Congress, Joint Committee on the Economic Report, *Hearings*, Subcommittee on Low-Income Families, December 12-20, 1950, 81st Cong., 1st Ses., (Washington: Government Printing Office, 1950), pp. 485-511.

21. James C. Coleman, "Equal Schools or Equal Students?," *The Public Interest*, 1 (Summer 1966), 72.

22. Cf. John Hicks, *A Theory of Economic History* (London: Oxford University Press, 1969), p. 139.

23. Cf. Otto A. Davis and Morton I. Kamien, "Externalities, Information and Alternative Collective Action," *The Analysis and Evaluation of Public Expenditures: The PPB System*, (Washington: U.S. Government Office, 1969), I.

24. The benefit principle of taxation actually is an efficiency type criterion for judging the fairness of taxes along equity lines. It suggests that the tax burden of financing a governmentally provided good or service should be distributed among individuals according to (marginal) benefits received, which is a thinly disguised attempt to price goods in the public sector in a way analogous to the way they are priced in the private sector.

25. Cf. Weisbrod, p. 124.

26. Friedman, p. 125.

27. To the extent that families without children are also subject to the property tax to finance local education, expenditures may exceed the "local equilibrium."

28. Of course, public (cf. *infra*) benefits cannot be parceled out, so "shares" is used here guardedly.

29. John D. Owen, "Education for Majority Voting?," *Public Choice*, 6 (Spring 1969), 65-66.

30. Cf. James M. Buchanan, *Public Finance in Democratic Process* (Chapel Hill: University of North Carolina Press, 1967), p. 192.

31. Even so, merger is feasible only if the number of firms is small, and the trouble remains that merger may distort resource allocation via monopoly or monopsony. Cf. Davis, Hulett, and Meyer, and Davis and Kamien.

32. Weisbrod.

33. Hirsch, et al.

34. Weisbrod, p. 1.

35. *Ibid.*, pp. 6-7.

36. Hirsch, et al., p. 414.

37. Carl S. Shoup, *Public Finance* (Chicago: Aldine, 1969), p. 97.

38. Cf. James M. Buchanan, *The Public Finances* (Homewood, Ill.: Richard D. Irwin, 1970), pp. 417-432.

CHAPTER 4

Education And Economic Growth

MARY JEAN BOWMAN

Economic growth probably is the most universally accepted and the least understood criterion of public policy, and especially of policies concerning education. Evidence relating to the place of education in economic growth is of many sorts, but often untidy; the implications of this evidence for educational policy are largely indirect and not nearly so unambiguous as commonly is supposed. Only slightly less difficult is the related but inverse question: how does growth affect demands for education and how will it affect the nature of the options open to oncoming cohorts of American youth? To top all of this, "growth" is not an unambiguous nor a unidmensional concept. Every major decision relating to growth is in some degree a decision concerning the shape of growth and the kind of society in which men will live in the future.

No single paper can provide an adequate discussion of so complex a set of problems. At most, in this chapter I can only pick out a few major themes and cite particularly interesting pieces of evidence. I will try to place the data in a moderately orderly framework, while clearing away at least some of the underbrush that has grown up around the topic of "education and growth."

The plan of this paper will be as follows: A prolegomena introduces readers to some main themes in the thinking and writing of economists concerning education and growth; it also issues a few warnings against common misconceptions of what economists have been doing. Section II opens up the question of how much education in the aggregate has contributed to growth in national income; it discusses what the evidence on this topic amounts to and how it may be interpreted. Section III pushes the analysis back of the aggregative summaries to deal with relationships between growth and the demands for skills, learning at work, the effects of "certification," and education as a source of adaptive and innovative competencies. A shorter final section makes a few selective comments on the subject of educational policy and the shape of growth.

PRELIMINARY REMARKS CONCERNING EDUCATION AND GROWTH

Following are some prefatory observations concerning education and growth.

The Tide of Events

Successive generations of economists going back to the predecessors of Adam Smith have argued the "economic" value of education, and some have quite explicitly viewed it as an investment. Periodically over intervening generations, groups of economists have become very much involved in proposals for policies about education. But at no time since the mercantilists, I would guess, has there been anything remotely approaching recent interest in the part that either "art" or education can play in economic growth.[1] This long swing seems the more dramatic because during the interval between the two world wars, concern among economists about education was at a low point. Those were years during which everything seemed to be in surplus except jobs. The "economics of education" dealt with how to meet your school budget.[2] In the United States education had long been regarded by most economists as an instrument for democratization of economic opportunity, with both distributive and efficiency implications.[3] But all this was simply taken for granted; during a deep and prolonged depression economists' major efforts were directed elsewhere.

Out of World War II, however, there emerged a new era, one in which interest came to be directed increasingly to long-term economic growth. This interest had its roots in a dramatic succession of events, of which two perhaps were salient. (1) A technological revolution opened new vistas of productivity in the war-torn economies. (2) Political events already under way before the war brought many newly independent but poor ex-colonies into existence, and they presented a challenge to all economists who thought in dynamic terms. These changes ramified into every society of the world in greater or lesser degree. The technological revolution brought an extraordinarily rapid economic growth in most of Europe, in North America, and in Japan over the years following World War II. Meanwhile, as rising aspirations for growth were diffusing among poorer nations, new and old, throughout the world, technical assistance replaced colonialism. Leaders of new nations strove to achieve a higher rank in an international community in which the level of a nation's education was a mark of status. And to top it all, schooling was linked into the nationalistically competitive race to attain or retain international leadership on the technological-economic frontiers. The United States was deeply involved on all these fronts, both at home and abroad. With or without economists, education had exploded into the 1960s and voices that had been submerged under the mood of depression or the exigencies of total war became louder and were heard. The idea of "human capital," which had in fact a venerable place in the history of economic thought, was revitalized in the context of a world-wide concern with economic growth.

Education and Growth in the Aggregate

It is conceivable that all of these events might still have been insufficient to propel the economics of education so dramatically to the forefront, however, had it not been for a development within economics that had no initial connection with education at all. I refer to the production, elaboration, and refinement of national income accounts, supplemented more recently by an increasingly sophisticated econometrics of aggregate production functions. National income accounting gave us a common measure and a specified common goal—or so it seemed. Aggregative econometrics gave us "the residual" or growth that could not be explained in terms of the usual inputs. That "national income" is not so hard a datum or so unambiguous as normally is assumed hardly mattered; who could dispute that it was better to have "more" rather than "less?" Neither did it matter that the "discovery of the residual" factor of unexplained growth was dramatic primarily because economists had been using narrow measures of inputs, so inappropriate to analysis of dynamic growth; i.e., the conventional models worked only when there was relatively little growth to explain. The tools and accumulated data of national-income accounting were at hand, and the huge unexplained "residual" of economic growth in a period that had witnessed rapid growth was there for all to see. In Norway, in the United States, in Finland—the evidence began to accumulate even in the 1950s.[4] In the search and the argumentation over "the residual," education was a likely candidate for at least some of the credit. Where this search has led us, what sort of evidence we have accumulated, and some of the major questions that it raises (and evades) will be considered in Section II, in a treatment of Education and Growth in the Aggregate. Along with that analysis I shall consider also the question of associations between the distribution of educational attainment in the labor force and levels of per capita income.

Education in Production

No other aspect of the recent involvement of economists in the study of education has had quite the repute of the aggregative assessments. This has nothing to do with the methodology, which is highly technical in its most sophisticated variants. It is just in the nature of things that aggregative measures can be summed up in a few figures, rightly or wrongly; and they cut the widest swath. But they are not the sharpest tools for analysis of the place of education in economic growth. For a better understanding one must look in detail at what happens to men in their post-school years after they are at work, whether for others or for themselves.

In part that is what "manpower economics" and "manpower planning" is all about, though several very different meanings are covered by those terms. And manpower planning in and for the United States is very different from the conventional manpower "requirements" analysis disseminated by international agencies and used rather widely in Europe. I shall have something to say about the evidence collected by manpower planners, but their work covers only a very limited set of operations.

Research concerning one or another aspect of earning, learning and innovating in the post-school years is attracting some of the best talent in economics today. Both theoretical and empirical investigations are illuminating a wide variety of topics that are crucial to understanding how education enters into and sustains economic growth. How, for example, may labor-market institutions affect the role education plays in economic growth? In particular, how do these institutions affect and reflect associations between learning at school and at work? How far do they foster or impede the effective utilization of the productive potentials available in the labor force? What is the economic significance of certification? How may this affect observed wages and how far may it lead to significant disparaties between observed returns to education and real productivity effects of education? If the numbers of persons with, let us say, college education is substantially increased, should we expect diminishing relative earnings of college graduates, or is it likely that the demand will be strong enough and "elastic" enough to absorb them into the economy at little or no reduction in relative earnings? How, quite specifically, does the pace of growth in itself affect the sorts and levels of skills demanded, and how does education in turn affect the pace of growth? Or, to put this last question in a somewhat different way, may education—up to a point, at least—generate its own demand for educated people, and not only in the schools but in the economy at large? Such are the questions to be considered in Section III. That section will draw upon a diversity of theoretical and empirical work, including work centering around private rate-of-return analysis,[5] even though citing only a few contributions explicitly.

The Role of Benefit-Cost Analysis

If "benefit-cost" analysis is not quite as fashionable a phrase as "systems analysis," it may soon become so; unfortunately, the semantic deterioration that has accompanied diffusion of "systems analysis" as a label covering mental fuzz as well as good work has already begun. Here I am using the term benefit-cost analysis to mean exactly what it says, whether the particular variant used is "private" or "social," in a "present value" or a "rate-of-return" form.[6] Benefit-cost analysis entails the very explicit comparison of estimated benefits of an action with what taking that action "costs." Benefit-cost analysis is possible only where what is realized (the benefits) can be expressed in the same units as what is sacrificed in alternatives (the costs). Benefit-cost analysis of "social investments," as in highways, sewage facilities, water control, or education, is an extension and adaptation of general theory about investment and capital. The focus from start to finish is on the public decision, and the approach to planning is through project evaluation, usually within a market economy. This is not centralized planning of a total economic system. Private rate-of-return analysis, which has come to play so important a part in the economics of education, is concerned with decisions of either individuals or firms. Although the decision most often examined has concerned whether to continue further in school or to enter the labor market, there have been other important applications as well.

Benefit-cost analysis stands in a distinctively oblique position in the study of the part that education plays in economic growth. There has been much confusion, and not a little error, on this matter, which needs to be cleared up. First, it is important to recognize what benefit-cost analysis, in any form, does *not* do. (a) Benefit-cost models do not *in themselves* provide any direct clues concerning economic growth. Evidence concerning effects of educational investments upon future streams of income is needed for forward-looking benefit-cost assessments, to be sure. In social benefit-cost accounting it is the stream of the national income over future years that is relevant; for private benefit-cost assessments it is of course private future streams of income that will count. But even social assessments for education have normally not gone beyond the use of *assumed* growth-rates to adjust cross-section data on differentials in earnings associated with differentials in levels of education. (b) Furthermore, *in principle* rate-of-return analysis is inappropriate for the explanation of observed aggregative associations between education and economic growth. Whatever the benefit-cost model used, it entails the discounting of expected future income streams to permit comparison from the perspective of a particular point in time—the decision point.[7] This is quite different from explaining the level of the national income or its rate of growth. After all, that income will be realized in a succession of undiscounted presents. (c) To introduce both costs of education and education-wage differentials into analyses of what education contributed to growth is superfluous. Benefit-cost assessments are decision models and the crux of the matter is comparison of returns with costs. The explanation of the impact of education on economic growth is a very different matter.

Benefit-cost analysis generally and rate-of-return analysis in particular do have a place in the explication of associations between education and economic growth nevertheless. I have already implied that theoretical work centering around private rate-of-return analysis has contributed significantly to the investigation of post-school work and learning patterns; this is a very indirect and subtle linkage to analysis of economic growth, however. Two direct associations between the study of growth and benefit-cost analyses deserve more specific mention. (a) Comparisons of rates of return and their patterns over time tell us something about the functioning of the economy, in terms of its efficiency or the distortions in human-resource formation and utilization. Such comparisons provide evidence concerning both persisting features of the economy and how it adjusts in the dynamics of growth. Total unemployment aside, there is nothing in other approaches that provides any sort of clue with respect to malallocation of resources and the resulting reduction of national income.[8] (b) *Assume we have evidence from other sources* concerning the dynamics of growth and about how readily increased numbers of variously educated people will be absorbed into the labor markets. Benefit-cost estimates (social or private) are designed to tell us what will then be the policies most favorable to growth in national income and what will best serve the strictly "economic" interests of young people currently coming through the educational system —after all, these two topics are very much the same so long as we grant the validity of existing measures of economic growth. The proviso is an important one, but for the moment I shall let it pass.

EDUCATION AND GROWTH IN THE AGGREGATE

When econometricians discovered that the "residual" of unexplained growth was a value well over half of total growth for the postwar years in most western countries, education was one of the most likely candidates put up promptly to claim the honors. Indeed, one favorite label given to the residual was "the human factor," although many economists preferred to call it "advance in techniques" and looked more to unmeasured improvements in the quality of physical capital than in the quality of the labor force. Despite almost fifteen years of efforts to account for this residual, and some success in paring it down, the proportion of growth unexplained remains high whenever growth has been substantial. "The measure of our ignorance"[9] perhaps remains the most suitable label for the residual. Economics still lacks an even approximately adequate theoretical framework for dealing with the truly dynamic elements in rapid and sustained growth.

How far, in fact, has education been the answer in this search to identify sources of economic growth? How does evidence from longitudinal studies within the United States compare with that for other advanced economies? What clues may we find by comparing the states of the United States? Is it legitimate, for that matter, to add all levels and kinds of education together in some weighted aggregative measure of "labor quality" or does the particular way in which educational attainments are distributed over the labor force make a difference? On each of these questions some bits of evidence, at least, have been accumulated over the past decade.

Education and Growth in a National Accounting Model

The first attempts to identify explicitly the part played by education in economic growth were by T. W. Schultz and Edward F. Denison.[10] A number of adjustments aside, their two treatments of education rest on essentially the same assumptions. The inputs of services into the economy attributable to an increment of education embodied in a man (compared to another man with less education) are measured by the earnings differential of, say, college above high school graduates. Denison made a substantial adjustment for the presumed association between "ability" and schooling in order to get at the pure effects of schooling. Adding up the differentials in earnings associated with each incremental level in a man's schooling gives a valuation of the total input of human-capital services by him, as distinct from his "raw labor." From this point it is simple to go on to estimate relative changes in average quality of labor and how much of the increase in national income may be attributed to an increase in the "quality of labor" (human-capital services) per employed person.

But it is of the first importance, in reading the results of this work, to recognize just what it does and does not tell us. Both Denison's and Schultz' estimates of what education contributes to the output of an economy and hence to economic growth are predetermined once the way of measuring the "quality of labor" has been settled. This is less evident in Schultz' treatment because he took an indirect route; he estimated human capital for each level of embodied education in cost units, to which he then applied a rental-value/cost ratio, but it comes out in the same place. The methodology is straight national-income accounting. There is no independent test of the aggregative effects of education upon growth in national income.[11]

Denison's results for nine western nations over the period 1950-62 are summarized in Table 4-1. Turning first to column (4) we see that education accounted for as much as .4 to .5 percentage points in national income growth per annum in three countries: the United States, Belgium, and Italy. Elsewhere the contributions of education were substantially smaller, and it will surprise no one who is familiar with educational events in Germany since the 1930s to find that country at the bottom of the list.[12] The *proportion* of total growth in national income explained by education is of course a function both of how many growth points education can claim and of the overall rate of growth. The highest figures in column (7) are accordingly for the United States and Belgium; the Italian figure is lower simply because Italy experienced the highest annual growth rate (except for Germany). The United Kingdom, on the other hand, experienced the lowest overall rate of growth, which gives education a higher *relative* position. Similar estimates made recently for several less developed countries show higher absolute and relative contributions from education, reflecting the rapid pace at which education has diffused through their populations and the continuing large differentials in earnings by educational attainments, almost regardless of rates of growth in national income.[13]

Among the most interesting of these results is the diversity in growth patterns displayed. This interest is not destroyed by any criticisms that may be made of the methodology in general or of such details as the much-debated downward adjustment for ability. In this study, as in others, the interaction of age with experience in the determination of earnings is ignored; adjustments for age and for education taken separately do not meet this problem. Closely related is our inability to separate out the effects of schooling and of post-school training and learning;[14] even if age-education interactions were taken into account the results would be confounded by effects of labor market institutions including, for example, seniority conventions.

The last column of Table 4-1 displays the very large proportion of growth in national income that cannot be explained by the inputs Denison estimated: from two-fifths in the United States to three-fourths in France and almost as much in Italy. Actually Denison attempts to account for part of these residuals in other ways, such as estimates of "scale effects," "improvements in the efficiency of resource allocation," and so on. After a truly herculean effort he cut the unexplained remainders down to approximately 25 percent in most cases, and gave that residual of residuals the label "advances in knowledge." Directly or indirectly education might deserve a little credit for part of this remainder if we assume, for example, that the quality of schooling had improved, or if we give education credit for unspecified innovations. Definitely, however, the label "advances in knowledge" does not consititute an unrestricted license for educators to stake out claims. Rather, we are brought back once again to the elusiveness of the real dynamics of growth. The findings with respect to education are no more than rough indicators of the order of importance of the problem at hand: analysis of the role of education in economic growth. And if the findings say one thing more than any other, it is that the part education plays can vary widely in the aggregate among advanced nations, irrespective of the pace of economic advance.

This last observation is underlined by an interesting comparison that was included in Denison's study. Finding that per capita incomes in Northwestern Europe as a whole in 1960 matched those for the United States in 1925, he analyzed the sources of the two sets of differences with United States per capita incomes of 1960.[15] The overall difference in each case was 41 percent of the U. S. 1960 per capita figure. Taking that base as 100, education accounted for a third of the discrepancy be-

TABLE 4-1
SOURCES OF ECONOMIC GROWTH IN NINE WESTERN NATIONS, 1950-62
(as Estimated by Edward F. Denison)

	Growth Rates in Percentage Points per Annum							
		Contributions of Factor Inputs					Proportion of Total Growth explained by:	
	Total Growth (1)	Physical Capital (2)	Employment (3)	Education (4)	Other Labor Adjustments (5)[a]	Increased Output per Unit of Input (6)	Education (7)	Output per Unit of Input (8)
United States	3.36	.83	.90	.49	−.27	1.41	15	42
Northwestern Europe, Total	4.70	.86	.71	.23	−.11	3.01	5	64
Belgium	3.03	.41	.40	.43	−.07	1.86	14	61
Denmark	3.36	.96	.70	.14	−.25	1.81	4	54
France	4.70	.79	.08	.29	.08	3.46	6	74
Germany	7.26	1.41	1.49	.11	−.23	4.48	2	62
Netherlands	4.52	1.04	.78	.24	−.15	2.61	5	58
Norway	3.47	.89	.13	.24	−.22	2.43	7	70
United Kingdom	2.38	.51	.50	.29	−.19	1.27	12	53
Italy	5.95	.70	.42	.40	.14	4.29	7	72

Source: Edward F. Denison. ***Why Growth Rates Differ*** (Washington: The Brookings Institution, 1967), Tables 21-1 through 21-20.

[a] Adjustments are for mean hours worked and changes in the age and sex composition of the labor force.

tween U. S. per capita incomes in 1925 and 1960 but for only 9 percent of the discrepancy between European 1960 per capita income and the U. S. 1960 figure.

Education in Aggregate Production Functions

One of the most serious limitations of the work just discussed has already been pointed out: the results are predetermined in the sense that there is no independent validation of the implicit hypotheses concerning contributions by education, or other factors, to growth. In fact it is possible to *overexplain* growth where educational advance has been rapid and yet the economy has stagnated; this happened in an application of such a model to the Soviet Union for the 1930s. Econometric aggregate production functions can circumvent this problem and provide a procedure for validating the various labor-quality adjustments.

So far as I am aware, the only longitudinal econometric national-income analysis that has incorporated a labor-quality variable is a U. S. study of the period 1945-65 by D. W. Jorgenson and Z. Griliches.[16] They used a chain-linked Divisia index procedure in specifying the labor-quality (as other) inputs. This procedure allows for adjustments in weights where relative wages associated with one versus another level of education rose or fell. Thus no particular assumption with respect to "elasticity of demand" is imposed on the model, though it does assume, in common with all national-income accounting, that relative wage rates are good approximations to productivity ratios. And it treats labor-quality units as additive. Among the final results of the Jorgenson-Griliches study were an estimated 1945-65 per annum growth rate of 3.59 percentage points, just over a tenth of which they attributed to improvements in the quality of the labor force[17] compared with Denison's estimate of 15 percent for the period 1950-62.

Other relevant econometric studies have included (1) a longitudinal analysis of sources of income growth in U. S. manufactures over the period 1947-60, (2) cross-section studies of determinants of state differences in value added in manufacturing as a whole and within selected two-digit manufacturing industries, and (3) cross-section studies of sources of variation in incomes in agriculture among 39 states and 68 regions.[18] Results in the analysis of interstate variations in value added for manufacturing industries were uneven; in only 6 of the 18 cases was the coefficient on education statistically significant at the 5 percent level. However, there were systematic biases in reporting errors, which tended to push the education coefficients toward zero. In Griliches' study of manufacturing as a whole, analagous cross-section results gave very strong coefficients on education; these results are less susceptible to random error or error bias. The coefficients on education or skill variables in the analysis for agriculture were also statistically significant, though education contributed very little additional explanatory value after other factors were taken into account.[19]

In the longitudinal analysis of GNP from manufacturing, Griliches estimated the 1947-60 rate of growth in income at 3.22 percentage points a year. Schooling per man accounted for .73 percentage points, or 23 percent of the total growth; this was more than double the contribution from increased man hours in manufacturing over the same period.[20]

Summing up, these studies have been directed to aggregative questions; what they have tested is the validity and significance of highly aggregated factors in the explanation of economic growth. There is just one measure of "labor quality" or educational inputs into the productive system. Whether we look at the economy as a whole, at the agricultural sector, or at the manufacturing sector, the aggregated measures of education embodied in the labor force turn out to be statistically significant. Although education is by no means the universal, overwhelming element in accounting for the earlier "residuals" that has sometimes been imagined, the findings do confirm that aggregative and not merely the "micro" returns to education are important.

Meanwhile, in the very process of specifying "labor quality" measures for the aggregative analysis of growth in national income issues are inevitably raised concerning ways in which education (and other factors) may affect growth. Do wage ratios remain comparatively stable over time even with substantial increases in the proportions of workers with high school or college education? Are the longitudinal patterns in this respect consistent or not with observations across countries or across states within the United States? What would explanations for the observed patterns mean in detail for the growth impact of expansion at different levels and kinds of education over time? These questions call at the least for some selective disaggregation in the specification of labor-quality inputs.[21] Or, taking another view of the education mix, we might ask how far the effects of education on development may be a function of the way education is distributed among the members of the population; the same aggregate weighted value for labor quality could have been entered in Griliches' sort of equation when there was a concentration of the labor force around a model level of schooling as when there was a polarization of the distribution, with relatively many at the lowest and highest levels and relatively few in the middle.

The list of issues and questions could be extended indefinitely. Some might in principle be answered by the same or similar econometric methods if there were an appropriate disaggregation of the labor inputs in some respects at least. Other questions, including most of those relating to the *processes* by which education may contribute to growth, cannot be answered without the use of other types of models in empirical research. And it will bear repeating once again that decision questions, which require comparisons among alternatives, are of another order. Econometric studies of growth, however refined, relate only indirectly to educational policymaking. To continue to cite those findings as sufficient justification for further expenditures on education is irresponsible. These studies do give some support to the argument that education has contributed to growth, but they do not in themselves show that further expenditures on schooling would be an efficient way to encourage growth.

The Education Mix and Incomes Across States

The national-income accountants and the aggregate-production-function econometricians have put all kinds and levels of schooling, properly weighted with wage ratios, together in one variable. The manpower planners have pulled the pieces apart, though more by "skills" than by "education," and without using monetary valuations of any kind. Recent attempts to extend rate-of-return analysis to a study of effects of distributions of education in a population have focused on associated patterns in the distributions of income.[22] But the question of how the shape of the distribution of educational attainments affects per capita income or economic development has been largely neglected. In part this might be attributed to the difficulty in getting adequate data, but available data have not yet been exploited; the question simply is one to which little attention has as yet been directed. One reason for this neglect is unquestionably that the hypotheses that would give such study meaning flow either from a concern with information and communication or from technological-economic hypotheses usually considered only in the literature on less developed countries. The latter have been "offbeat" for the United States, and the former has been a fringe concern in the economic literature, notable primarily for its nuisance value and *ceteris paribus* status. A new formal "economics of information" simply does not meet the case.[23] Almost certainly, nevertheless, we must expect a rising concern about the relationships between the shapes of distributions of educational attainments (and opportunities) and the processes and rate of economic development. This will happen, if for no other reason, because of the internal social-political-economic stresses in the United States today. Problems of lead and lag in development and the diffusion of opportunity (among individuals and among regions) are not likely to fade away. It is part of Professor Schultz' insight that he has so fully perceived the significance of information and communication in economic development—and not only in his more recent work in the economics of education, but also in some of his long-continued work on the economics of agriculture.

Two regions do not permit a regression analysis. Nevertheless, it may be useful initially to take another look at how the South compares generally with the rest of the country.[24] As of 1960, the proportions of urban males over 25 who had gone beyond high school was actually higher in the South, even though many more urban southerners had never completed eighth grade. Median years of schooling among urban males were almost exactly the same in the South as in the North. Using measures of labor quality that have become conventional in aggregative growth analysis, the "quality-per-worker" figures for the urban South and other parts of the country would have been very nearly the same. The North-South difference on an education-based quality index for human resource inputs derives almost totally from the educational backwardness of the *rural* south. Nevertheless, average wages (and hence per capita earnings) in southern cities are substantially below those in the cities of the North. The explanations are many, of course, and most of them are confounded by racial discrimination and by reflections of rural poverty in the cities. But the fact remains that a salient feature of the South is its decided deficiency in the proportions of workers who are in the middle of the educational scale. The South is a society of great social and economic distances from man to man, and intuitively it would seem clear that potentials for economic development would remain seriously limited until that educational bipolarity is weakened. This problem is not remaining southern, however; for two decades it has been migrating into the northern slums, becoming more acute as the children in those families enter the labor force. The difference is that the center of the educational distribution has shifted, and the educationally isolated men of tomorrow will possess a nominal ten or eleven years of schooling instead of less than eight. This, by the way, is where some particularly serious questions concerning both "ability" as operationally defined and "quality" of schooling are most likely to confound our measures of productivity and of growth.[25]

A recent study by William Vaughn touches at least obliquely on the issues I have just raised, and poses a few puzzling questions of its own.[26] Vaughn was particularly interested in the question of how far educational attributes might explain interstate differences in per capita incomes. The strongest variable in his multiple regressions (proportion of adults participating full-time in the labor force) "explained" 70 percent of the variance among states in per capita incomes (Table 4-2).[27] A four-variable equation prior to entry of any education variable (but including an index of occupational status) explained 88 percent of the variance. The entries in the first column show the zero-order correlations for each of four education measures used by Vaughn.

The first three equations in this table say roughly what we might expect. The startling results appears in equation (4): a strong *negative* coefficient on mean years of schooling in an equation that includes also measures of proportions at the bottom and at the top in schooling. It is the proportions at the bottom that turned the sign and raised the coefficient on mean years of schooling to a highly significant negative value. The first reaction of a statistician would no doubt be to express skepticism because of the problem of "multicollinearity." There is multicollinearity to be sure, but the unambiguous "identifica-

TABLE 4-2
EDUCATIONAL VARIABLES IN EQUATIONS EXPLAINING INTERSTATE DIFFERENCES IN PER CAPITA INCOMES IN THE UNITED STATES, 1960

Independent Variables[a]	*Zero-order Correlation Coefficients*	*Regression Coefficients on Education Variables*[b]				
		(1)	(2)	(3)	(4)	(5)
Education Variables (labor force)						
E_m = Mean years schooling	.77	140** (2.6)	60 (1.1)		−720** (3.5)	−1050** (3.6)
$E_{16}+$ = Proportion with 16+ years	.77	—	73** (3.5)	79** (4.3)	170** (5.6)	213** (5.3)
E_{0-7} = Proportion with under 8 years	−.65	—	—	−32** (2.9)	−52** (4.0)	−63** (4.3)
E_{12} = Proportion with 12 years (non-cumulative)	.61	111	111	—	—	28 (1.6)
R2		.926	.943	.940	.959	.961
F		88	97	103	117	108

NOTE: Entries in parentheses are t values

**Significant at .05 probability level.

[a] There were three other demographic and labor force variables in equation (1), five such variables (all the same) in the remaining equations.

[b] These show dollar change in per capita incomes associated with an increase of one year in E_m or of 1 percent in the other education variables.

Source: Adapted from William Vaughn, "Correlates of State Incomes with Particular Emphases on Educational Attainment," Ph.D. Dissertation, MIT, June 1970, pp. 181-86.

tion" of particular coefficients is not the point. The interesting thing is what these results suggest concerning relationships involving a total distribution when we look at the whole pattern of coefficients. By putting three education variables into equation (4), Vaughn has specified three dimensions of education distributions that are indeed partially independent and also (the important point) interactive in their effects on levels of overall economic attainment. Together the coefficients do give us some insights into just this interaction problem. In further explorations Vaughn tried other equations in which he added the proportion who had some but incomplete high school, the proportion with some but not all four years of college, and the proportion who were high school graduates. The most interesting of these is reproduced as equation (5). While the E_{12} variable is not in itself statistically significant, it raises the coefficients (and t values) on each of the other education variables. What we now have is a pattern that I interpret as pointing very clearly to the importance of what I earlier called the distance gap between people at the bottom and those in the middle and upper ranges of schooling.

To take extreme cases, we should expect to find the highest per capita incomes where there are many college graduates, high school completion norms are observed, and relatively few drop out of school except after reaching a completion norm. We will find the lowest incomes where completion norms generally are *not* observed and where the distribution of schooling reveals a polarizing tendency, with exceptionally large proportions at the bottom of the educational scale and in the leisurely ranks of college men and women who never take a degree. Norms are changing and the particular empirical relationships will almost certainly shift. Indeed, the shift is occurring as the people who have not finished elementary school disappear; it must be remembered that these data refer to adults of all ages. But the basic import as I read it from Vaughn's results, and the implications for education among the disadvantaged sectors of the population, will not be substantially altered merely by a nominal upgrading of attainment levels.

EDUCATION IN PRODUCTION

Turning the education-in-growth question around, we may ask: what are the characteristics of demands for educated people, and how elastic are those demands? But this question immediately leads us into others. Do earnings really reflect productivity or just certificates, as Ivar Berg would have us believe? More fundamentally, is it appropriate to formulate our analysis in terms of "demand" at all? Even in a growth context, the notion of "demand" tends to take on static connotations, as though what were wanted was predetermined. Yet there are men who, quite literally, create their own jobs—and some even of these are hired workers. It is awkward for researchers, but in the nature of man, that it is difficult to say when "human capital" is finished or what it will do in action. Man is ingenious and creative, and he does not stop learning by any fixed schedule. I shall start here with the more conventional questions relating to analysis of demands (and then prospects) for services of men with various levels and kinds of "skills" or schooling. The discussion will shade progressively into more elusive and dynamic questions.

Economic Growth and Demands for Skills

One of the most debated questions in discussions of educational planning for economic growth has been centered around the issue of substitutability among skills. To make complex problems empirically manageable, there has been a tendency, furthermore, to start from extreme assumptions, introducing qualifications only at a later stage in the work. The neoclassical economists (whether working with aggregate growth models or social benefit-cost analyses of educational decisions) started from an assumption of infinite substitutability. This would make wage ratios classified by education highly stable whatever else happened; that procedure delayed direct investigations into associations between "demands for skills" and economic growth. By contrast, the manpower planners, in starting from the other extreme (i.e., no substitutability) were forced immediately to collect data on associations between growth and the skill composition of the labor force.

The Elusive "Manpower Requirements" and Structural Adaptation. In its more sophisticated versions, manpower planning evolved as the servant of general economic planning, taking its objectives and its critical operating assumptions from a general economic "plan." But the forecasting of "manpower requirements" for economic growth developed into a technician's specialization—carried on with only tenuous connections to any general economic plan. The conventional manpower model is entirely "quantitative," in essentially the Russian mode: except for measurement of national income, the use of money measures is ignored and even eschewed. Though at least two of the early world leaders in this work were American, it has been carried out mainly in Europe.

In seeking to identify the "requirements" for reaching growth targets, manpower planners have accumulated evidence concerning the occupational and educational composition of the labor force in most of the industrial and in many economically less advanced nations. That evidence reveals a high degree of variability in relationships between income and educational characteristics of the labor force, and that educational variability within occupations is extremely wide internationally. Indeed, the observed associations of per capita incomes with educational characteristics were even looser than with occupations. Whatever else may happen, industrialized development has entailed a rapid improvement of technologies which, in turn, unquestionably require the skills of armies of "technicians." It is no accident that Harbison and Myers found virtually no correlation on a world scale between national per capita income and subjects studied in college, though there is a high correlation between level of income per capita and proportions of the labor force employed in science and technology.

Meanwhile scholars of quite a different inclination were pointing out that in the United States the upgrading within "occupations" was at least as important as the changes that had occurred with economic growth in the occupation mix. It has become increasingly difficult to identify an "occupation" unambiguously, and we are never sure how far changes in the education of the men in an occupation have caused changes in the occupation itself. Clearly evident is the wide scope for adaptation in the processes of economic growth in industrialized nations, even when particular techniques in particular industries allow little scope for variation in the combinations of human skills with physical capital. But this says nothing about the other side of the picture: how a restructuring of the productive activities and the upgrading of jobs in terms of educational stipulations may be affecting the utilization of lower-level skills or the supply of job opportunities for the less educated. Neither does it say anything about pay as related to education-occupation categories.

Elasticities and Shifts in Demands for Skills

A severe limitation that manpower analysts have typically placed on themselves has been the disregard, or even the discard, of all price and wage data. Analysis involving wage data —and hence all the more exacting work on elasticities of substitution among skills and on elasticities of demand—has come from other quarters. This work is just beginning, but thus far the evidence is generally supportive of the high-elasticity hypothesis. In other words, it has been found that very large relative changes in the relative quantities of two skills have been accompanied by very small or negligible rates of change in relative wages. Samuel Bowles reached these conclusions using cross-national data for three education categories; his elasticities were especially high as between the college and intermediate levels of education.[28] Selowsky has reported high rates of substitution among skills in manufacturing in the United States.[29] Among the lowest elasticities I have seen are those estimated for Puerto Rico by Hudson Milner,[30] relating to substitution across age classes within education levels; but even Milner's estimates are high compared to recent estimates of elasticities of substitution between physical capital and labor generally (undifferentiated by "quality" or skill). A practical implication is that unless we run wild in education and neglect parallel investments in physical capital there should be little reason to fear that further expansion of schooling would produce embarrassing "surpluses of over-educated persons." But this is not to say that a substantial expansion in numbers attending college would have no effect on relative wage rates, or that it would be the most effective way to use additional resources in pursuit of economic growth.

A more general sort of evidence concerning elasticities of substitution among skills has come out of the aggregative studies of the sources of growth in national income. Generally the results are the same. Wage ratios have been quite stable over a period running from the first population census that provided data, for 1939, right up to the sample current population surveys in the late 1960s and in the face of very substantial changes in the proportions at each level of educational attainment. This stability is evident whether the ratios being compared over time are for wages of college graduates relative to high school graduates or of the latter relative to eighth grade graduates, and so on. (Actually there has been more change in the relationship of middle to bottom levels than of the top to middle levels.) To many writers the relative stability in these wage ratios has come as a surprise, considering the truly impressive pace at which the American labor force has been upgraded educationally. Immediately this raises the question, why did the ratios remain so stable?

The human-capital theorist who applies a Becker mode of analysis will remark that this stability in wage ratios probably goes along with stability in private rates of return to investments in education;[31] the implication is then that people are rational in their educational decisions, with a consequent long-term continuity in the adjustments to shifts in demands for skills. But even if this has been the case, we are not enlightened as to why demand should have increased just sufficiently to soak up the floods of graduates during the past two decades without reducing their relative earnings. Does a general increase in income in a growth economy lead to greater demand for goods and services that are skill intensive? Is physical capital, which has also increased rapidly, complementary with skilled rather than unskilled labor? And if such complementarity prevails, we might again ask, why? How far, in fact, is it possible that in the long run the higher skills may create their own demands—as each generation of more and better educated people provides the base for exactly those sorts of technological innovations, modes of business organization, and modifications in communication and information processing that will utilize still more of the higher skill capacities? In other words, we might turn the "manpower requirements" question around to suggest that education may largely create its own "manpower requirements," and not just in the obvious way, within the educational system itself—though in the United States today that system is an immense devourer of qualified manpower (e.g., teachers) and helps, thereby, to maintain the earnings of its graduates. There is considerable evidence that the system does operate in just this self-fulfilling way, but it is unlikely that we could work through to unambiguous answers with coefficients attached. For the dynamic relationships just hypothesized imply the existence of a complex variant of one of the many chicken-and-egg identification problems that are encountered when causal and not merely statistical explanation is at issue in the social sciences. And unfortunately, even if this beneficent process is operative for the more fortunate majority, it could seriously aggravate problems for the less advanced minorities.

Growth and the Economics of Certification

During the "teach-ins" accompanying the "sit-in" at the University of Chicago last year, one group of graduate students, in their recommendations for university reform, suggested three kinds of Ph.D's: one in theory, one in research, and one in activities. The distinction between the one in theory and the one in research was shocking, of course; but I cite this incident because of the inclusion of the "Ph.D. in activities." Surely this is "certificitus" carried to a point of madness. It is as though the world were the university, and no man could learn, or at least no one could get a job, except under the seal of that institution. It is a sad commentary on the capacity of these students for reasoned thought that this recommendation to stretch university credentialing was made in the midst of protestations that there should be no grades, few requirements—that there should, in fact, be no meaningful certification. That would be higher education for everyone in the image of the Oxbridge gentlemen of leisure of a former day, but with a label attached to verify that at some point John or Mary was here, even if he or she did not learn how to use the English language.

We are not yet at a stage in which anyone is expounding seriously the theme that everyone should have a Ph.D., or suggesting that if you don't go on for such a degree you will be a "drop-out." But unquestionably pressures on young people to get more and yet more schooling are strong, provided they did not opt out from almost the start. This raises critical questions about the effects of hiring by certificate or diploma. How extensive is this practice and what are the implications with respect to efficiency in the utilization of human resources and the interpretation of rate-of-return measures in assessing investments in education?

In the arguments around this question there has been a strange interlacing of old-world traditional elitism, a distinctly American variant of the manpower-planning approach, and today's concern with the disadvantaged and underprivileged. All of these elements are illustrated either explicitly or inadvertently in Ivar Berg's new book *The Great Training Robbery.*[32] Despite defects, this is a book that needed very much to be written.

The elitist theme is inadvertent; it slips in with Berg's uncritical resurrection of Seymour Harris' 1948 book on *The Market for College Graduates.* Berg is arguing that Harris may in fact have been right even then (despite the evidence cited in earlier parts of this paper and the rate-of-return findings), and that his argument must be even more compelling today. Unnoticed is the strong elite-status thread in Harris' work and in the arguments of many who continue to prophesy doom should "too many" people be allowed or encouraged to attend college. A main theme of Harris' book was the prophesy that the increasing numbers of college graduates would be unable to find suitable jobs, the concept of "suitable" being jobs of a kind to which college graduates (or Harvard graduates in particular?) were supposed to be entitled. Suitability was never defined in terms of productivity and Harris introduced no economic criteria of evaluation. Yet he implicitly denied any substantial validity to the notion that college might be viewed as an investment in capacities to enjoy future consumption and leisure activities, not merely as preparation for careers carrying high social status. It is important that this elite argument of some of those who are less than enthusiastic about expansion of subsidies to higher education today should be recognized. It is no less important to distinguish the foregoing from other arguments that may lead to the same position but on quite other grounds.

Berg definitely does not adopt the elite-status position. On the contrary, he takes off from Harris to challenge the validity of economists' assessments of investments in education at high school or college levels. Moreover, the main thrust of his empirical explorations is to challenge the meaning of the estimated returns to completion of high school. This is where he brings in what I would term an American (as distinct from a European) variant of manpower analysis. This view is best represented by Richard Eckaus, who is concerned with precise specification of just what skills are needed for the efficient performance of a long list of jobs defined as unambiguously as possible.[33] If employers are hiring men with skills substantially higher or broader than those "required" for the job, then, the argument goes, this is wasteful, and the employers are displaying their ignorance. Berg collates a variety of evidence gathered by others and himself to demonstrate that employers are frequently both biased in favor of more educated workers and ignorant about the actual educational backgrounds of their workers and about relationships between workers' education and productivity. Unfortunately, he draws a large part of his evidence from observations on workers in comparatively low-level jobs, including operatives in textiles. These are precisely the spots where negative selectivity from among the better educated should be expected. And it is not clear how far the generalized opinions of employers about education and the kinds of jobs examined by Berg or the actual recruiting to those jobs were in fact coordinated.

The critical questions come down to the following: (1) Is there evidence of prevalent irrational economic behavior in biases of employers toward hiring better educated over less educated young people (or people of any age)? (2) From a societal point of view are we paying substantial sums for an inefficient system of labeling qualities of human-resource outputs and getting false signals on our "rates-of-return" into the bargain? (3) Even if the information system is reasonably efficient, does it exaggerate differences of future learning and earning opportunities for the more compared with the less educated men? Answers to (2) and (3) are closely interlocked.

Question 1. Berg's evidence cannot support a conclusion of pervasive irrationality in the behavior of employers. Recruitment of better educated men will not be irrational economic behavior on the part of the employer so long as he pays them no more than the less educated and their performance is no worse. Or putting this another way, he will have nothing to lose by giving preference to the better educated men even if he proves to be wrong in his bet that they will generally be more productive workers; the important thing is that the likelihoods of success should not be actually reversed. If the general probability is no difference in productivity between the two sets of men, but there is also a greater chance of finding a man capable of rising in the organization by recruiting primarily from certificate holders, it would be irrational for the employer to fail to take this into account. The question remains whether inertia (nonmaximizing behavior) may lead employers to use school certification as a guide in hiring where other ways of obtaining information would be more efficient in the end. To the extent that the latter is the case we may expect a modification of hiring practices—which is exactly what is occurring where applicants are coming from school systems that differ substantially in quality and in presumptive standards for graduation.

Question 2. Even if employers are on the whole rational in their uses of school certification as a clue to recruiting men with traits favorable to successful performance on the job (and, if the concern is taking a longer view, performance in future roles in the firm), it does not follow that this information system is efficient socially. The employer does not pay the schooling costs; he gets the information, for whatever it is worth, free.[34] If on the average the better educated man is little more efficient and has no higher future potential—if the main thing that is happening as more people stay longer in school is more like competitive advertising than product improvement—then the society is indeed paying a high price for the information service schools are rendering. Moreover, the selective process may indeed give us estimated rates of return to schooling that grossly exaggerate the social benefit-cost relationship. This will happen even without certification bias in selection to *better* jobs as long as there is a certification bias in the rates at which people are hired at all, leading to exaggerated differences between better and lesser educated youth in rates of unemployment. This, indeed, is one of the main thrusts of Berg's argument. It would be a powerful thrust provided we accept his evidence of the non-productivity of schooling; but that evidence, as I have already remarked, is dubious. Paradoxically Berg seems to be attacking rate-of-return evidence as though it were built up in manpower-fashion, where everything is supposed to be tidily labeled and fitted, and he argues as though *only* certificates were considered in hiring. Yet he takes the least successful graduates for comparison with the normal graduates. As every economist who has looked at wage data knows, the variation of earnings within schooling categories is very high relative to the between-class differences in mean earnings. The rate-of-return estimates are summary figures of central tendencies; behind these are, of course, overlapping distributions. Berg has weakened his argument by exaggeration and distortion. That there are some negative spillovers in employment experiences of the less educated can hardly be denied.

Question 3. Even if we were to deny all validity to the argument that society is paying an unconscionable price for poor information about the "quality" of labor-market entrants, it may still be true that the system operates to exaggerate inequalities of access to growth centers, and in a cumulative fashion. This begins with discrepancies in initial rates of unemployment. But that is not all. Let us suppose two men of equal ability (in an operational sense of productive potential) when they enter the labor market. Their ability and potential will include whatever of relevance they have learned or not learned in school. We may suppose also that both find jobs without difficulty. So long as certification provides any usable information at all, in an efficiently operating economic system the man with more schooling will have the better chance of being recruited into employment where he will be selected for "grooming" to take on progressively greater responsibilities. He will have a greater chance both to show what he can do and to learn along the way. *A priori* there would seem to be strong reasons for suspecting that the economic system does indeed exaggerate disparaties in career opportunities, even setting overt discriminatory practices in apprenticeship aside. These inequalities have no measurable effect on economic growth, but if they are substantial they will have a very important effect on the shape of society as it evolves in the growth process. And development at each stage in turn could have effects on subsequent growth that we are quite unable to project or evaluate. Berg's concern about this problem is well worth quoting.

> If education is increasingly a formal credential of progressively less economic importance, a more serious question arises than whether most educated people in our society are "utilized" in some economically meaningful way. For such a "credentialing" process isolates a significant population group with modest educational achievements from the rest of American society. America, it may be argued (in either moral or economic terms), can afford such a development even less than it can afford to have disenchanted college graduates in its work force.[35]

It should be noted, however, that we have arrived in this discussion not at a discrediting of rate-of-return estimates (which is one of the things Berg was trying to do), but at an argument for energetic investigation into and reform of information services—a reform especially on behalf of those whose formal credentials are less than impressive.

Skill as Adaptation and Innovation

Only when we view men as men, not as bundles of skills, can we understaand the role of education in economic growth or the effects of growth on incentives to undertake further education. The essence of growth is that it is indeed a dynamic process, and preparation for effective participation in that growth must be preparation for learning and adaptation. Manpower planners, with their target dates and their emphasis on "skills" rather than on education, are in this respect the worst offenders, despite their legitimate claim to having focused explicitly on economic change. But even in the rate-of-return literature, which has fostered an increasing theoretical and empirical concern with learning and earning over an entire school-work career, many writers set learning and earning apart. There was "learning" and there was "earning," and men would accept lower pay now in order to have a chance to learn more on the job and thereby to earn more in the future. Although there have been voices urging that the important contribution of education in production was specifically what it did to a man's ability to learn and to adapt in dynamic situations,[36] little attention has been paid to this proposition in the canonical rate-of-return literature. It is easy to agree and then forget that what employers want to buy when they hire educated men may be the capacity to learn at work, and to learn yet again and again. Perhaps educators are guilty too; it is not at all the same thing to have mastered a particular problem, or reached a particular level of performance on an achievement test, as to have or have acquired a capacity to reach successive performance levels rapidly. The latter, which is of course a function of both innate ability (measurable or not) and past learning, is surely the critical component in "labor quality" at the cutting edge of change. Looking at a wider range on the occupational scale than Berg considered, this was what I encountered in interviews with personnel executives in a dozen large corporations some years ago, but it is not new. Elsewhere

I have cited evidence to this same effect given in hearings before the Parliament of England back in 1848.[37]

Surely this has been an important part of the reason why demand for the college-trained and the increase in their numbers have moved so nearly in parallel over the past decade. The kinds of technological change and the kinds of skills needed for rapid learning in a large-scale economy, with its proliferating information systems, call for a relatively high level of general education for most workers before entry to the labor market. This is not to suggest that most jobs call for high levels of adaptive learning. Rather, unless we think only of jobs that in their very definition are concentrated on producing change, it might be said that the call for adaptation is a call for the ability to shift from an old to a new job with minimum loss of efficiency. Neither do I suggest that the completion of a high school or a college education provides any guarantee that the individual will in fact be adaptable, let alone innovative. What the diffusion of school education can do and has done for economic growth, if this analysis is correct, has been to increase the pool from which men for the critical spots can be drawn, and to raise the levels of adaptability among others sufficiently to allow for a more rapid diffusion of improved technologies.[38]

It is almost impossible to test these propositions by statistical or even by more sophisticated econometric methods, which is undoubtedly one reason they have received comparatively little explicit attention. However, Finis Welch carried out an interesting study in a paper the title of which I took to head the whole of Section III of this paper; he called it "Education in Production."[39] His empirical analysis refers to farm operators, and hence to people who had a greater range for decision-making than would characterize the general run of wage and salaried workers. The focus is on how education affects the allocative ability of the farmer, "in the sense of selecting the appropriate input bundles and of efficiently distributing inputs between competing uses." He concluded that much of the leverage of added schooling was "drawn from the dynamical implications of changing technology." But he went on to show that this held only for skills that result from *college* education. He concluded that the trend toward larger proportions of purchased inputs in agriculture "should have increased the role of the innovator-allocator."

EDUCATIONAL POLICY AND THE SHAPE OF GROWTH

Growth is not one thing, but many, and every decision that ostensibly fosters economic growth is at the same time, intentionally or not, a decision relating to the shape of growth. This fact is often neglected in policy discussions, partly because people find it more comfortable to separate the distributional from the growth criteria. One of the consequences is often fallacious perceptions of the degree of compatibility or incompatibility between "growth" and "equity" goals. Evidently we cannot say much about educational policy for economic growth without paying some attention, at least, to what sort of growth is envisaged, and how the various components of growth have been weighted in our concepts and measures. In rounding out this paper I shall accordingly consider three topics, each very briefly: (1) how growth is normally measured, (2) growth aspects of the case for and against more subsidies to higher education, and (3) some issues concerning investment in disadvantaged groups as growth strategy.

Concerning How Growth is Measured

An increase in measured national income (in one or another of its variants) is conveniently accepted as the measure and even the definition of economic growth. This is an unavoidable pragmatic compromise for many purposes, but whenever we are inclined to use national income or economic growth as criteria in the formulation of social policy it is essential that we step back to reconsider just what we are doing. Which things are we counting and how do we weigh one thing compared to another?

Among the most widely recognized and widely discussed problems in national-income accounting is the artificiality of the distinction between what is measured because it goes through the market and what is omitted because it is not marketed. The prime example is of course women's homemaking tasks: food preparation, for example, is counted in the national income when it is done in a bakery or a restaurant but not when it is done in a home. Omission of the child-care activities of mothers in their own homes from the national accounts unquestionably has distorted the way in which we think about welfare programs and about investments in one or another form of pre-school child-care and education.

Equally or more important is the fact that when we measure the national income we weigh every man's dollar the same, no matter how many dollars he may have. The $300 "mink coat for your daughter's doll" advertised one Christmas season counts as much in the national income as the housing for three months of a family paying $100 a month. Measured national income is a weighted figure that relates to national and per capita welfare by tenuous links at best. Measurement of total national income is further complicated by commitments of public funds to vast undertakings (most dramatically the space program) that have no direct connection with expressed preferences of citizens, rich or poor.

Measured growth in national income is not quite so elusive a concept—at least if we set the big public undertakings aside. So long as the measured gain has not been offset by unmeasured costs (as in progressive pollution, uncosted increase in travel time to work, and so on), and so long as no group in the population has suffered absolute losses, we may regard the measured increase in national income as an unambiguous gain of sorts. But this takes no account of the fact that benefits which accrue primarily to those already most comfortable economically do not have the same human impact as those accruing in large part to those less comfortable economically.

Colleges for What Sort of Growth?

There is a widespread illusion that university people are not only disinterested in the subject, let us say, of farm subsidies, but also in subsidies to higher education. In fact, while they may be generally disinterested in analysis on the former, they definitely are not on the latter. They are listened to precisely where, perhaps, they should be most suspected, and they have long been ignored where they have both the expertise and the inclination to speak in the public interest. There is no getting around the fact that the demand for college graduates has been sustained in some considerable measure by the demands of the educational institutions themselves and by the nature of government commitments in research and technology. Government expenditures on housing comparable to those on the space program, for example, would have perceptibly raised the demands for lesser as compared with more schooled people. Whether arguments against heavy public expenditures on housing may be sound is not the point. Public decisions have contributed significantly both to what the economy would produce and to who would produce it, for what pay.

This is not the end of the story, however. Such evidence as is available suggests that in agriculture, at least, college education may significantly raise productivity by hastening the adoption of new inputs and of improved practices. At the same time, and by the same process, it has also furthered the consolidation of farms and dispossessed many from the land into the urban slums. Black people especially have been so affected because they were located in areas of high agricultural potential. (The large numbers of white migrants from the hills of Appalachia faced a very different situation.) The history of agricultural progress over the past decade raises some troublesome questions concerning the social in contrast to private returns to investments in college education of farm people. Would a slower pace of progress have been less costly in the unmeasured impact on those who were squeezed out? The conventional economist's answer will be a simple one: immediate aggregate productivity has almost certainly been increased by the rapid pace of technical advance, and there will be few who would suggest that college education should be discouraged among farmers. I make no such suggestion, but this progress is not without its uncounted costs.

How far college education may be a sound social investment for rapidly increasing proportions of the urban population, and whether the drive to provide junior colleges accessible to all is justified on growth grounds can also be challenged. The rate-of-return estimates indicate that this has been a sound investment in the past, even counting government subsidies as well as foregone earnings of student in the costs (that is, even with full accounting of societal costs). However, these rates are lower than the observed rates of return at lower levels of the educational system, and there is some reason also for anticipating that social rates of return to college education will decline.[40] Neither of these observations gives sufficient grounds for accepting the forecasts of a wave of unemployed or underemployed college-trained, but they do raise questions about priorities on the margins of social choice. There must be a limit to the "adaptability" and innovative capacity arguments in application to college education as the pool of college-trained men encompasses ever larger fractions of the population, however strong the arguments concerning adaptability of the high school graduate compared to the drop-out. And once again, there can be no doubt but that in some degree the sheer magnitude of the flow of college alumni affects the forms that technical and organizational change will take, and hence the structures of demands for skill in the future.

Where the Big Problems Reside

The really big problems are not at the top, but at and near the bottom. According to Becker's estimates, private rates of return to investment in college education fluctuated around 13 to 14 or 15 percent over the period from 1939 to 1960 while private rates of return to investment in four years of high school climbed steadily from an estimated 16 percent in 1939 to 28 percent as of 1958 and seem to have remained at about that level.[41] The social rates, taking public subsidies into account, would be lower, but still impressive. Do these high estimates provide valid signals with respect to either private or social investments at lower levels of the educational system? The figures are certainly suspect, and for at least two reasons (setting minor details aside).

Most important is the fact that as larger and larger majorities of each age cohort complete high school (whether or not going further), there is an increasingly negative selection of those who remain behind. It is increasingly fallacious to treat observed income streams for high school graduates and nongraduates as though they referred to populations essentially similar except for the fact that some did and some did not complete high school; minor adjustments on this account are not enough. It is not that the average ability of secondary graduates is declining, as is so often assumed. On the contrary, the more important change may be that the sifting out is more complete. A very small group of defectives aside, the negative selectivity of those left behind is primarily a social, not a genetic phenomenon; but this does not alter the fact that the high rates of return to upper primary and secondary school are misleading.

The second, and lesser, reason for suspecting the figures is the argument stressed by Berg, that certification biases in recruitment distort the estimates of rates of return; differences between realized prizate earnings overstate differentials in social productivity, quite aside from any negative selectivity out of high school completion.

Evidently the case for increased investment in lower levels of the educational system, in preschool education, in out-of-school supplementary or in compensatory programs, gains only limited support from the high rates of return. Worse yet, studies focused directly on benefit-cost analyses of compensatory programs have come up with very low rates of return or low measured net benefits. It would seem that the case for further investment in such programs would have to rest on distributive or equity norms. However, this is not necessarily the case. The truth is that very little attention has been given to two important matters. One of these is the extent of the inputs of better educated families into the education of their children, both directly and indirectly.[42] If we did any accounting for those inputs, however gladly they may be made, the results might look quite different.[43] And if at the same time we took note of the fact that children do not select their own parents, the whole process of social accounting might take a different turn. What about the present underinvestment in preschool human-resource development among children who are not the recipients of seemingly "free" parental inputs?

The second important matter is related to the first one. Our assessments of "quality" in schools have been derived from achievement results that incorporate education (or lack of it) received at home as well as at school. Even when there is an attempt to identify what the school adds ("value added" in the economists' terms) the observations include effects of concurrent supportive conditions in the home. Moreover, there has been a persistent and inevitable tendency to concentrate on the ways of teaching that would be most efficient for exactly those children whose families provided the best complementary inputs. There has been nothing approximating the investment in research and experimentation on the growing of slum children that has been carried out for the growing of corn. What Becker's high rates of return to high school education say to me is that we have been missing out on an investment in research and experimentation that could yield very high returns indeed even when assessed merely in terms of long-term economic growth—all other social or equity considerations aside.

FOOTNOTES

1. On the pre-Smithian writings, see E. A. J. Johnson, "The Place of Learning, Science, Vocational Training and 'Art' in Pre-Smithian Economis Thought," *Journal of Economic History*, 24 (June, 1964), 129-44. The first economist to approximate the rate-of-return approach to the study

of education was S. G. Strumilin, who analysed the roles of education and experience in earnings and productivity in Russia. His initial work was done in 1925. An abridged reproduction with very minor revisions appeared in *Ekonomiski Truda*, 1960, and an English language translation is included in UNESCO, *Readings in the Economics of Education* (Paris, 1968).

2. There were exceptions, of course. Among the most notable in the United States, and a quite direct precusor of post-war rate-of-return studies, was the Harvard doctoral dissertation and article on human capital by J. R. Walsh ("The Capital Concept Applied to Man," *Quarterly Journal of Economics*, 49 [February, 1935] 255-85).

3. This was not true of all democracies. Sweden, for example, remained educationally conservative while pioneering a welfare state.

4. There had been a similar earlier study by Jan Tinbergen, which appeared in German in 1942. His analysis referred to the period 1870-1914. The residuals, which he termed "efficiency increase," accounted for half or more of the growth rates in Germany and France, a fifth to a fourth of growth rates in the United States and the United Kingdom. It was only after this article was translated into English in 1959, that it began to be known beyond a small circle. See Jan Tinbergen "On the Theory of Trend Movements" in his *Selected Papers* (Amsterdam: North Holland Publishing Company, 1959).

5. It will not be feasible, however, to discuss here the important theoretical work on labor market institutions and their effects on post-school human-resource formation and utilization.

6. There is a substantial technical literature on this subject, but the best non-technical exposition I have seen is in Valerien Harvey "Economic Aspects of Teachers' Salaries," doctoral dissertation, University of Chicago, March, 1967.

7. For a discussion of this matter see Mary Jean Bowman "Schultz, Denison, and the Contribution of 'Eds' to National Income Growth," *Journal of Political Economy*, 72 (October, 1964) 450-64. Esoteric theoretical formulations that evade this problem are possible, but of limited pragmatic value in application to education as an investment. (See Robert M. Solow *Capital Theory and the Rate of Return* [Amsterdam: North-Holland Publishing Company, 1963]).

8. In this connection see Arnold C. Harberger "Using the Resources at Hand More Effectively," *American Economic Review* 49 (May, 1959), 134-46.

9. This label must be credited to Moses Abramovitz.

10. T. W. Schultz "Education and Economic Growth," in National Society for the Study of Education, *Social Forces Influencing American Education* (Chicago, 1961), pp. 46-88. Edward F. Denison *The Sources of Economic Growth in the United States and the Alternatives Before Us*, Supplementary Paper No. 13, Committee for Economic Development, (New York, 1962). Edward F. Denison *Why Growth Rates Differ* (Washington: The Brookings Institution, 1967).

11. See Bowman.

12. Fortunately changes in relative wages of men with differing amounts of schooling were sufficiently small over the period covered to create no major problems in using a constant wage ratio in the valuation procedures; adjustments are needed when longer time periods are involved, and this is always a problem in cross-country comparisons. As a matter of fact, if Denison had used for the United States the earnings ratios used for Northwestern Europe, he would have raised the U.S. estimate of contributions of education to growth.

13. Psacharopoulos estimated sources of Hawaiian growth for the decade 1950-60. (George Psacharopoulos. *The Anatomy of a Rate of Growth: The Case of Hawaii, 1950-1960*, Economic Research Center, University of Hawaii, Honolulu, Hawaii, 1969). The total growth rate in percentage points per annum was estimated at 5.20. Education accounted for .64 growth points, or 12 percent of the total using Denison's ability adjustment factor of .60. Psacharopoulos argues against this adjustment, however,

and suggests further that "spill-over" effects might justify application of a ratio above 1.0. With no adjustment either way, education would have been credited with 1.08 growth points per annum and 18 percent of total growth. An interesting feature of Psacharopoulos' study is his break-down of components of the growth rates attributed to education by segments of the educational system (primary, secondary, and so on). The only countries for which estimates in percentage growth points match or exceed the Hawaiian figure of .64 are Mexico and Chile (barring more recent estimates that I have not seen). Estimates for Mexico and Chile, provided by Selowsky, were .73 and .78 percentage points respectively (Marcelo Selowsky "Education and Economic Growth: Some International Comparisons," Ph.D. dissertation, University of Chicago, 1967).

14. This problem arises in rate-of-return analysis also. It is *not* true, as is sometimes asserted, that internal rates of return exclude effects of on-the-job learning. They are in fact average rates of return to investments in schooling and associated training or learning on the job.

15. Denison, 1967, Table 21-29.

16. D. W. Jorgenson and Z. Griliches, "The Explanation of Productivity Change," *Review of Economic Studies*, 34 (Autumn, 1967) 249-83.

17. Estimated from data provided in *ibid.*, p. 272, Table IX. In this publication Jorgenson and Griliches estimated that they had accounted for 3.49 percentage points as attributable to measured inputs. However, in a later reworking of the data the estimated effects of changes in utilization rates of capital equipment were reduced, leaving close to a third instead of three percent of observed growth unexplained by measured inputs in a set of estimates for the period 1948-67. This is discussed in Laurits R. Christensen and Dale W. Jorgenson, *U.S. Real Product and Real Factor Input, 1929-1967*. Harvard Institute of Economic Research, Discussion Paper no. 109 (February, 1970), mimeo.

18. Griliches' research has been reported in a series of articles on aggregate production functions in agriculture and in manufacturing. Some of the most interesting results for the economics of education are brought together in his long essay entitled "Notes on the Role of Education in Production Functions and Growth Accounting." That essay will be included in a volume of proceedings of the Conference on *Education and Income* of the Conference on Research in Income and Wealth held in Madison, Wisconsin, November 15-16, 1968 (National Bureau of Economic Research, New York).

An industry-by-industry analysis for 18 manufacturing industries is reported in S. M. Besen "Education and Productivity in U. S. Manufacturing: Some Cross-Section Evidence," *Journal of Political Economy*, 76 (May/June, 1968), 494-97.

19. In his agricultural studies Griliches tried out several alternative ways of making the labor-quality adjustments; the results proved to be quite insensitive to whether the measure was based simply on mean years of school completed or on one or another weighting system derived from wage or income ratios.

20. Zvi Griliches "Production Functions in Manufacturing," in Murray Brown, ed. The Theory and Empirical Analysis of Production, (New York: National Bureau of Economic Research, 1967), p. 317.

21. On this point see my "Principles in the Valuation of Human Capital," *Review of Income and Wealth*, Series 14, No. 3 (September 1968), pp. 217-46, and Finis Welch "Linear Synthesis of Skill Distribution," *Journal of Human Resources* 4 (Summer, 1969), pp. 311-27.

22. See especially Gary S. Becker, *Human Capital and the Distribution of Income* (Ann Arbor: Institute of Public Administration and Department of Economics, University of Michigan, 1967).

23. For a readily accessible discussion of the "economics of information," see George J. Stigler, "Information in the Labor Market," *Journal of Political Economy*, 70 (October, 1962), supplement on *Investment in Human Beings*, pp. 94-105.

24. For detailed analysis see my "Human Inequalities and Southern

Underdevelopment," in James W. McKie, ed., *Education and the Southern Economy*, published as a supplement to the *Southern Economic Journal* (Chapel Hill, North Carolina, July, 1965), pp. 73-102.

25. So long as the "ability" levels of average college, or high school, or eighth-grade graduates, and so on, have not changed over time, it will make no difference in the regression results for the econometric models of growth that there are persistent differences in the average abilities of people at each level of educational attainment. Furthermore, even if there is some change in these respects, the effects on the regression results will normally be minor. The situation is very different when the problem at hand is to estimate effects of education on earnings in rate-of-return studies and in Denison-Schultz kinds of growth accounting, in contrast to the Jorgenson-Griliches economic procedures. An excellent discussion of the "ability" problem in assessments of education in economic growth is included in Griliches' forthcoming "Notes." See footnote 18.

26. William M. Vaughn, "Correlates of State Incomes with Particular Emphasis on Educational Attainment," Ph.D. dissertation, Massachusetts Institute of Technology, June, 1970.

27. Because Vaughn used a step-wise regression program, it is not possible to determine what results would have been obtained had the education variables been entered early in the regression, except, of course, for the zero-order coefficients. The beta coefficients in an equation paralleling equation (4) but excluding the occupational status index were very nearly identical with those in equation (4).

28. Samuel Bowles *Planning Educational Systems for Economic Growth*, Cambridge: Harvard University Press, 1969. The analysis of particular interest here is in Chapter III. (The estimates are of "historical" not partial elasticities.)

29. Commenting on an unpublished analysis by Selowsky, Bowles states (p. 55) that for all nine pairs of types of labor for which estimates were made using data from fifty-nine U.S. manufacturing industries elasticities of substitution were significantly greater than 6 at the 95 percent significance level.

30. Hudson, Milner, *Estimating United States' Effects on the Economic Growth of Puerto Rico* (University of Chicago, thesis seminar paper).

31. According to Becker there has been a big increase in private rates of return to high school completion, though rates of return to investment in college education have fluctuated within a narrow range—above 12 and below 15 percent. (See Gary S. Becker *Human Capital* [New York: Columbia University Press, 1964] p. 128.) I would question the rising estimates for high school rates, however, both on account of increasing negative selection out of high school completion and a probably upward bias in the application of routine cohort-growth adjustments of cross-section age-earnings data to high school graduates.

32. New York: Praeger Publishers Inc., 1970.

33. See Richard S. Eckaus "Economic Criteria for Education and Training," *Review of Economics and Statistics*, 46 (May 1964), 181-90.

34. Higher wages are not in question. The employer will give the better-schooled man higher wages only if that man is doing or will soon be doing a different job, which brings us right back to (a).

35. Page 60.

36. Richard Nelson has stressed this theme in several papers and conference discussions, the best known of which is a short paper he wrote jointly with Phelps (R.R. Nelson and E. S. Phelps, "Investment in Humans, Technological Diffusion, and Economic Growth," *American Economic Review* 56 [May, 1966] 69-76). Both C. Arnold Anderson and I have pressed this argument on numerous occasions in our writings over the past decade.

37. Cited in my "From Guilds to Infant Training Industries," Ch. 6 of C. Arnold Anderson and Mary Jean Bowman, eds., *Education and Economic Development* (Chicago: Aldine Publishing Co., 1965).

38. See Nelson and Phelp.

39. Finis Welch "Education in Production," *Journal of Political Econ-*

omy, 78 (January/February, 1970), 35-59. This is an important econometric study, both in its theoretical formulation and its empirical application.

40. The problem of a huge seasonal influx of college students into the labor market must inevitably increase with the increase in proportions of young people continuing through college. The three month vacation period is definitely obsolete; no rational economic case can be made for its continuance at any level of the educational system, but specially at the higher levels.

41. Table 14.

42. Investigations into the determinants of differences among schools in the mean achievement scores of their pupils underscore the importance of these inputs, both individually and in their mutual interactive effects for entire neighborhoods and school peer groups.

43. Economists' estimates of "intergeneration-effects" of schooling have been gross understatements because of failure to allow sufficiently for this phenomenon.

CHAPTER 5

Economic Analysis of Institutional Alternatives for Providing Education (Public, Private Sector)

CHARLES S. BENSON*

The decade of the 1960's was a time for experimenting with technology of educational processes. Some of the pieces of this "technological revolution" were (1) ungraded primary programs, (2) instructional television, (3) team teaching, (4) language laboratories, and (5) computer-assisted instruction. That technological revolution left American educational institutions largely undisturbed. In contrast, the decade of the 1970's is likely to see a great deal of structural experimentation, i.e., examination and testing of alternative schemes for financing, managing, and controlling schools and various other educational institutions. It is possible that the "structural revolution" will produce fundamental changes in flows of educational and training services and in the distribution of those services among households.

Before we consider the sorts of structural changes that are most widely being discussed, let us consider some of the pressures that have led people to demand new arrangements. In the main, these (somewhat related) pressures can be described in three categories: (1) dissatisfaction with the operations of large public bureaucracies; (2) concern with rising costs in both public and private institutions; and (3) dislike for the manner in which services are rationed among competing households. All three pressures reflect the way in which we have organized production and distribution of social sector goods during that time when we were becoming a highly urbanized nation.[1]

PRESSURES FOR CHANGE IN EDUCATION STRUCTURES

In more detail, let us consider how changes that formerly were unthinkable have now become probable.

Dissatisfaction with Large Education Bureaucracies

This is a problem of economic efficiency, in that it is claimed public school systems are failing to produce those bundles of outputs that are most highly valued by consumers. The problem is found most notably in large metropolitan areas. Big cities have socially heterogeneous populations—fortunately, one may say, unless we have decided we should all be confined in ghettos. At present, big cities seem to be unable to provide school services in sufficient variety and quality to meet the divergent consumer demands of their heterogeneous populations.[2]

Take the rich first. Common observation tells us that rich parents expect their children to receive high-grade instruction in recognized academic fields, to benefit from the help and advice of a high school placement officer who knows—and is known to—admission officers in well-regarded colleges and universities, and to have the pleasures of good sports and activities programs. These are special, albeit reasonable, demands, and in earlier times big cities met them. They met them, on the one hand, by running school systems that in general were superior to rural (and even suburban) systems and, on the other, by operating a set of elite secondary schools, which schools were characterized by college preparatory programs of academic excellence. These schools were protected by careful selection of students and faculty. It is difficult for big cities to maintain elite schools today. Egalitarian pressures, reinforced by a general sense of urban malaise, are inimical to them. Many academically minded teachers appear to find working conditions to be better in the suburbs than in big cities. And in the meantime the rich have opted either to live in the suburbs—probably there to continue to use public schools—or to stay in the city and pay for tuition for their children in private schools.

Since students are embodiments of various amounts of education capital—and this is so even when they enter school for the first time—withdrawal of the rich is likely to produce a decline in the productivity of central city schools, unless non-student resources can be provided in sufficient amount to offset.[3] Given that education appears to be forcefully subject to external economies of production, which is to say that the ceiling of academic performance in a classroom is "inexorably" set by the previous learnings, interests and motivations, of, say, the top quartile of students, it is unlikely that the cities can so offset the loss of educational capital of students from upper-(and upper-middle)-class homes, even if we look aside from the cities' claims of municipal overburden and financial crisis.[4,5]

But the real tragedy is the fact that big city schools are no longer regarded as generally superior. This is uniquely an American tragedy, for in most of the rest of the world, the best schools, in the main, are found in large cities. The rich might have held on in public education in the cities even while giving up their elite high schools if the city systems were thought to be generally better than suburban ones. The cities failed to exploit economies of scale that lay within their grasp. The process of deterioration has proceeded to the point where halting and reversing the decline will be difficult at best and especially so under the conventional bureaucracy of the large-city school district.[6] As it is, our youth from well-educated homes are growing up almost exclusively in socially homogeneous suburbs, isolated both from the interest that comes from getting to know people who have come from quite different backgrounds and from easy, first-hand contact with higher reaches of aesthetic life. Most painters, artists, actors, poets, playwriters, novelists, and musicians, after all, still live and work in the big cities—they are their natural environment and the natural showcase for the creative mind.

Next, take the middle class. Middle class families appear to prefer schools that are businesslike, that stress fundamentals of reading, mathematics, and science, that are not encumbered with "frills," and that have strict discipline.[7] Such objectives run somewhat counter, however, to what many poor families see that *they need*: teachers who are both warm and determined to see their students make progress, teachers who can help a child from a slum neighborhood overcome hostility toward the adult world (and toward learning in particular), and his feelings of helplessness and apathy. The response by middle class families, including a small but growing number of black families, to dissatisfaction with big-city *public* schools is to use the parochial.[8] There, learning of fundamentals seems to go along at a better rate and dicipline is stronger. But the poor, alas, have no *major* alternative, except in rejection of the aims of the public school and in a kind of mental withdrawal.[9]

The fact that families, whether rich, middle, or poor, are failing to get what they want in educational services from centralized, large-city districts has led to the demand that "consumers" of educational services be allowed to exercise a greater degree of choice in their purchase.[10] All of the measures proposed imply decentralization in the management and control of educational institutions. Some advocates of change would see it sufficient to break up big-city administrations of public schools into smaller units, adding possibly the proviso that parents' councils might exercise some administrative control over schools in their neighborhoods. Others see it necessary to "privatize" education by giving parents "vouchers," with which they may enter the open market for purchase of educational services. "Family power equalizing" and the use of contracts (all these proposals will be discussed in detail below) are two other non exclusive variants of administrative reorganizations.[11] Basic to the whole discussion is the idea that many families feel strongly about the kind of education their children receive and about its quality; hence, they should be allowed better means to choose for themselves what they are to have.

Stated this way, we can see that the drive for a greater amount of consumer choice may draw strength from parents generally, not just from those who live in the biggest cities. Further, families that are rich enough to exercise choice presently, in the sense that they have enrolled their children in non-public schools, might find proposals such as the voucher plan (though not necessarily family power equalizing) appealing, because those families would receive financial relief toward costs of private tuition.

Resistance to Rising Costs

Dissatisfaction with our present structure of education has roots in the visibly rising costs of services. Between 1963 and 1968, expenditures of state and local governments on elementary and secondary education rose at an average annual rate of 10.2 percent.[12] This was roughly twice the rate of increase in Gross National Product and three times the rate of increase in national income per capita. Ever since World War II, public educational expenditures have risen more rapidly than household incomes.

The reasons are several. One is simply that many households place a high value on education, both as a good thing in itself and also as a means to help their children get ahead in a competitive world that progressively rewards brain power more and physical labor less. Another reason for rising costs is that education has proved, intractably, to be a labor-intensive activity.[13] The possibilities of substituting (possibly) cheap capital goods for dear labor in educational processes have turned out to be extremely limited, so far. Moreover, labor in education has become dear, first, as enrollment increases outran increases in numbers of newly trained teachers and, second, as teachers have succeeded in organizing themselves into powerful bargaining units.[14]

Money is no longer forthcoming easily in many school districts, with middle size cities, a few very large cities, and districts where school tax rates are already at very high levels being hardest hit. In late 1969, the situation was described as follows: "Kingston, Ohio, taxpayers allowed their public schools to remain closed from Thanksgiving, 1968, to January, 1969. The Philadelphia Board of Education thought it might run out of funds. School systems from Chicago to St. Albans, Vermont, worried about school deficits for which no relief was in sight. For example, neither the governor of Illinois nor Mayor Richard Daley could produce the 10 million dollars needed to balance the current Chicago school budget. Everyone's funds were 'already committed.' "[15] People feel that schools—in spite of the difficulties under which they may operate—must find ways to improve their technological efficiency, i.e., to produce a larger volume of outputs for a given size of budget.

Fiscal constraint is not confined to the public sector. Parochial schools, faced with the requirement to employ lay teachers in rising proportions, to reduce class sizes, and to purchase new forms of instructional materials, are suffering budgetary deficits. This is especially the case in large cities. In New York, where the state government is already providing $40 million annually for sectarian schools, the Governor held in early March, 1970, that the financial plight of parochial schools required emergency action.[16] Five states now allow generalized aid to non-public schools (Connecticut, Hawaii, Ohio, Pennsylvania, and Rhode Island); legislation toward this end is under consideration in a number of other states, such as Illinois, Iowa, Massachusetts, Michigan, and Wisconsin. Aside from rescuing parochial schools in order to preserve sectarian education (though public funds, of course, are in support of secular instruction only), these actions of the states could be viewed as an attempt to obtain low-cost education in larger proportion, since parochial schools operate at a dollar cost roughly one-half to one-quarter as high as public.

Structural changes to improve technological efficiency take several forms. Privatization of education through, say, the adoption of voucher plans stresses the beneficial effects of competition among education institutions. The "invisible hand" of the market will serve to bring increased trade to those institutions that become more technologically efficient, while those that are inefficient will be pushed to the wall. Similarly, if educational services are to be purchased to a larger extent than at present under contract, and if contractors receive full payment only when they meet pre-arranged specifications about students achievement, then market forces could produce a kind of "survival of the fittest" among firms that provide instruction. Under Assembly Bill 2118 (considered in the 1969 Session of the California Legislature), it was provided that "urban self-determination schools" might be established with public support. Ad hoc governing bodies would staff and operate schools in disadvantaged areas, free of most regulations on certification of teachers and employment of noncertificated instructional staff. This would be one way to test the willingness of organized teachers to experiment with different patterns of staff specialization, including such practices as the assignment of routine duties to junior persons and the part-time employment of students to teach basic skills to younger students.

Another approach to the cost problem stresses not so much changes in technological efficiency as it does a more equitable sharing of the burden. The family-power-equalizing plan would have the amount paid by a household for school services a function of its income *and* of the quality of services it wishes to purchase.[17] Accordingly, user charges would be introduced in such a manner that the general taxpayer might no longer be called upon to foot the local costs for above-average or special-quality provision—in any case, he would find beneficiary households sharing the burden with him.[18] The voucher plan, on the other hand, would lift at least some of the costs of secular education from the shoulders of parents whose children attend parochial schools, as well as other private schools, and place them on the general taxpayer.[19]

Concern About Improper Rationing of Educational Services

Some of those who advocate change in structure of the educational system base their case on improper rationing of education services.[20] They feel that services are rationed in *too great* a degree on the basis of parental income and in *too small* a degree on such other factors as parental concern for the intellectual development of their offspring, "true" (as distinct from the "measured") ability of students, and interests and motivations of students. The problem arises in the first instance because most of our state governments delegate to local districts very substantial responsibilities for provision of school services, at the same time that states have drawn—or allowed to be drawn—a set of district boundaries under which taxable wealth per student varies enormously from one district to the next. While allowing for numerous exceptions, caused mainly by the unequal distribution of nonhousehold taxable wealth (industrial plants, public utilities, office buildings, etc.), it can be said as a general rule that rich households live in school districts where taxable wealth per student is high and poor households live in districts where taxable wealth per student is moderate or low.[21] Various state subvention plans seek to "equalize" expenditure capacities of local districts, but these schemes almost universally fall far short of the mark. Regarding local school tax rates as a "price" for educational services, it follows that rich households are likely to receive expensive services (well-trained teachers, small classes, extracurricular programs, etc.) at low prices (tax rates), while at the same time poor households are taxed heavily (i.e., pay high prices) to provide themselves with meager services.

For example, in 1965-66, within one county of California (Los Angeles), El Rancho, a relatively poor district, had a school tax rate of $4.50 per $100 of assessed valuation and received school services valued at $548 per student. El Segundo, a richer district, had a tax rate of $1.82 and received school services costing $753 per student.[22] Two things may be noted: (1) property valuations are fairly uniform within counties of California, so such an inverse relationship between tax rate and expenditures per student cannot be accounted for by variations in assessment practice; (2) as compared with such states as South Carolina and Illinois, California is commonly regarded as having a relatively well-developed set of "equalizing" state grants for district support of schools. A third point is that in the two districts noted, student achievement, as measured by state-wide tests, stood in a direct relationship to expenditure per student and inversely to tax rates. This kind of situation is by no means unusual in the United States.[23]

One makes of it what one will. Some would see the present state-local system as yielding a proper, not improper, rationing of school services. By and large, high-quality services are laid before students who have grown up in households where the parents are relatively well educated. It might be held that these are the very students who can and will make best use of opportunities provided them by their superior teachers, etc.

Others, including the author, feel that the rationing process, as it is working at present, is evil. "Education is the only planned, continuing, and universal relation with the state. Of all the state's benefits, therefore, it represents both the largest opportunity for and the most significant danger to the individual caught in its maternal embrace."[24] Society has determined that education shall be compulsory. Many households have little choice about where they live, residence not infrequently being determined by the nature and location of a man's work. If the children of a given household are to attend public school—which in many places is in effect required by law, since private schools are not universally available nor can all families afford them in any case—they must do so within the district of residence and in that single school chosen by district authorities. Taking account of these various requirements and practices, the question has recently been raised whether existing systems of educational finance meet constitutional guarantees with respect either to equal protection or to minimum protection of citizens.[25] Insofar as violation of constitutional rights can be proved, the present structure might be said to suffer from "social inefficiency."

ADDITIONAL FORCES FOR STRUCTURAL CHANGE

So far, we have indicated that the existing, basic structure under which educational services are provided is under attack on grounds of economic inefficiency (in failing to see that the character of school services fits well with parental aspirations and desires), of technological inefficiency (in failing to provide a greater degree of cost-effectiveness in its operations), and of social inefficiency (in allowing school services to be rationed substantially on the basis of a criterion largely irrelevant: parental income). There are other sources of unhappiness in our society which turn people against schools as they are now run, though some of them cannot be laid wholly or even partly at the doorstep of educational institutions themselves. Student unrest (which can be attributed only partly to school operations) and racial antagonism are two examples. Likewise, teachers' strikes provoke the public. To a degree, strikes may be a result of poor school management, but they are also manifestly a single element of rising worker militancy in the public sector generally.

Lastly, schools have unfortunately been the victim of false expectations. Note that unemployment is unevenly distributed in our country and that it is concentrated among minority members who have poor school records. Concentration of unemployment, in turn is associated with perpetration of ghetto life, with social disengagement and dependency, with neighborhood violence and crime, with broken homes and the passing along of education failure to the next generation. In the mid-sixties, it was thought that with the help of $1 billion annually of federal money, the schools could practically eliminate social class concentration of education failures, thus playing a major role in breaking the poverty syndrome and yielding a more even distribution of unemployment by social class. This could not be done quickly and it probably cannot ever be done without better planning and preparation than was available in the first attempt. The President's Special Message to Congress on Education Reform, March 4, 1970, stated: "We must stop letting wishes color our judgments about the educational effectiveness of many special compensatory programs, when—despite some dramatic and encouraging exceptions—there is growing evidence that most of them are not yet measurably improving the success of poor children in school." If much was expected and little provided, pressure mounts for structural change, however blameful or blameless most teachers may be.

MAJOR APPROACHES TO STRUCTURAL REVISION

Let us now consider major proposals for structural revision: decentralization, voucher plan, family-power-equalizing, contracting, etc. Some will be discussed at greater length than others, reflecting degrees of complexity, novelty, and economic interest.

Decentralization of Large Districts

The seminal document is the Report of the Mayor's Advisory Panel of Decentralization of the New York City Schools, *Reconnection for Learning* (1967), commonly called the "Bundy Report."[26] Though prepared obviously for New York City, the plan is relevant for other large cities of the country. New York had been engaged in a process of decentralization and had established local school boards before the Bundy Report was published. It continues to move toward a more effective decentralization of powers. From the time of presentation of the report, it was known that the Board of Education was opposed to the fast time-table recommended therein. Efforts to implement some of the central suggestions in the report led to a prolonged teachers' strike in 1968-69.[27] None of this background, however, detracts from the report as the major statement of the aims and means of achieving *bona fide* decentralization of powers.

The central shortcoming of New York schools, according to the Bundy Report, was that they were allowing too many students to fall below minimum standards of achievement. "In a 1965 statewide pupil evaluation conducted by the State Education Department, 55 percent of the students found to be below levels the State Testing Service defined as 'minimum competence' were New York City public school students, although the city's enrollment comprises only 35 percent of the state's total."[28] Moreover, ". . . one out of three pupils in the city's schools was a year or more behind youngsters in the nation as a whole in reading and arithmetic."[29]

The report stated that decentralization so far achieved was not "effective."[30] Martin Mayer, himself a former local school board member, was quoted as follows: ". . . there was almost nothing I could do for the people who called me, and little of substance came out of our meetings . . . This giant empire is almost completely insulated from public control."[31] It was said that the local boards could not hold anyone responsible for the performance of the schools in their districts, since insufficient powers had been delegated to the district superintendents.

The proposals made in the Bundy Report centered on the establishment of community school districts (intended to be of size 12,000 to 40,000 students) and on the relations of the community school districts to professional staff.[32] The new districts were to have powers to recruit and hire teachers and to petition the State Commissioner of Education for alternative means of certifying teachers. They would have the power to award tenure and to make assignments of teachers to individual schools. The districts would be responsible for in-service training and staff development.

It was thought that the following benefits would flow from these new arrangements: (1) there should be better cooperation among teachers, parents, other community residents and institutions because of closer community participation in school affairs, (2) a wider pool of professional talent would be available for service in the "less desirable" schools, (3) districts populated mainly by minority groups could hire a higher proportion of teachers sensitive to and sympathetic with the environment of the students than presently are serving in the affeced schools, (4) district schools would have more latitude and flexibility for innovation and experimentation than now exist.

Granted that effective decentralization might, indeed, produce these benefits, how well does this particular kind of structural change meet the problems of economic, technological, and social inefficiencies noted above? No one can say precisely, but the following points may be made:

Economic Efficiency. Unfortunately for the decentralization proposal, there is really no substitute for giving households a choice about which schools their children attend. The decentralization proposal does not do this, as one's specific place of residence still would determine the public school a child is allow to enter. Recall that economic inefficiency occurs (1) when urban consumers are not receiving these school services they value most highly and (2) when choice to rectify the situation is constrained. Under the decentralization proposal, choice remains constrained.

It is true that interested parents in large cities would have a greater chance to influence educational policy under decentralization than they do now, but the substitution of a set of smaller bureaucracies for a single large one does not mean that changes in school environemnt can be made very thoroughly in a short time. Further, even within a given school's attendance area, different parents have different desires for school services; indeed, within a single family, certain services may be sought for one child and other kinds of services for a second.

Imagine a man being chairman of the governing board of the school his child is attending and being a member also of the community school district board (as hypothetical of parental influence). Does he have the means to exercise as much choice about his child's education as he would if he could select to enroll his child in one of, say, six schools, each offering different curricular emphasis, staffing patterns, and expenditure levels? It would seem not. As long as attendance in a given school is determined strictly by specific place of residence, school programs must be more alike than different, because that program must not offend any parent sufficiently to represent violation of constitutional rights. Such bland uniformity is not the way to provide economic efficiency.

Of course, the decentralization plan might specify that the parent may seek to place his child in any school of the district, i.e., it may call for "open enrollments."[33] This forestalls districts from establishing racial or social class balance in school by prerogative of the administrative authorities. Also, a system of open enrollment could better approach both economic and social efficiency by "family-power-equalizing" (to be discussed below).

Technological Efficiency. It appears likely that decentralization would allow a greater amount of innovation and experimentation to take place. The channels for approval of schemes would be shortened and the number of persons who might act to delay approval or to veto schemes would be reduced. Ordinarily, decentralization plans do not call for the abolition of the central district administration (though that administration is expected to hand over most of its powers with respect to professional staff to local boards), and whatever influence the central administration formerly wielded to promote innovation and experimentation could still be wielded. On the net, exploration of new ways of doing things would probably increase, so decentralization could possible help in achieving greater technological efficiency.

It is not clear, however, how much gain in technological efficiency is to be achieved by innovation and experiment. On the other hand, it is plain that efficiency would be raised if teachers and students made up their minds to work hard. It is difficult to see how incentives to work hard are materially increased by decentralization. Suppose, however, that as part of the decentralization package it was decreed that (1) school enrollments were to be open; (2) students were to be admitted to schools of their choice on the basis of competitive examinations; (3) school principals were to be judged for merit increases and promotions on the basis of the length of the waiting lines of students to study in their schools and of teachers to work in them, and (4) teachers were to be judged for merit increases and promotions on the progress students made (not on their absolute levels of achievement) during the time they were in the given teacher's classroom. Then it could be said that some incentives had been established. Of course, these same incentives could be laid out before educators and students in a centralized system, but, taking account of racial strife and class antagonisms, they probably could not be accepted in big cities, except as provided under a decentralized system of control, if then.

Social Efficiency. Social efficiency is increased as parental income comes to play a lesser role in determining how educational resources are shared among students. How would decentralization of large city districts affect the relation between parental income and distribution of educational resources? First, decentralization would affect financial relationships *within* the boundaries of big city school districts. It would not attack the problems caused by the fact that some suburban systems can claim an undue amount of public sector resources because (1) they have vast amounts of taxable wealth per student and (2) at the same time they are free of "municipal overburden," i.e., extra heavy costs associated with density of population uncompensated for by having extra taxable resources. Second, let us recognize that at present public schools attended by poor youth in big cities often have larger dollar expenditures per student than do middle class schools in those same cities. Would this differential in favor of the poor be preserved under decentralization? It does not seem likely, if the aims of decentralization are taken seriously. That is, if local groups in the city are to have power with respect to their schools, they must control the school budgets. Such control implies that part of their dollar resources be drawn from local taxation. It is probable that poor neighborhoods will have less taxable wealth per student than middle class neighbors, though efforts could be made to ameliorate this problem by the judicious drawing of local district boundaries. However, say that some such discrepancies remain and that they are to the disfavor of the poor. Past experience indicates that state grants are unlikely to equalize the taxable resources of the separate districts. Hence, schools attended by students from poor households would have less general support per student than they do now, relative to other districts. Third, and on the other hand, decentralization would allow a better targeting of federal monies for disadvantaged youth, so schools in poor neighborhoods might receive more money in the form of special federal aids than they now do. Fourth, it is quite possible, moreover, that money would be more effectively spent in schools of poor neighborhoods under a decentralized rather than a centralized administration. Fewer dollars might buy more effective services, especially if the local districts really could hire teachers who were more understanding of the requirements of deprived young people. Taking it all together, decentralization would probably have a marginal effect toward improving social efficiency.

Summary. Bigness of administrative unit does not necessarily imply low quality of education. Recognition of the historical excellence of big city schools in the United States and of the continuing excellence of schools in the large cities of Europe should dispel such a notion. However, in this time of racial strife and class antagonism, decentralization of authority appears to make sense. This step would go some way toward improving economic and technological efficiency — and perhaps social efficiency as well, depending on the details of the decentralization plan. But the question is whether decentralization would do enough, taking account of the pressures for structural change that we described earlier. Indeed, the main result might be to take the heat off of the establishment and allow it to place the blame for educational failures on the "local community." We turn to some more radical proposals.

Friedman Vouchers

The proposal was made by Professor Milton Friedman, University of Chicago, in 1955, and it continues to draw attention up to the present time.[34] Professor Friedman indicated (1) that maintenance of a minimum standard of education for the whole population and (2) financing of education (in substantial part) by the state could each be justified by the existence of external economies of consumption of school services. On the other hand, he could find no overriding justification for administration of schools by the state, though he recognized that complete, sudden decentralization of education might make it difficult to attain a common core of values (a religious problem) and a mixing of different social classes (a secular problem); further, he foresaw that fragmentation of school services in sparsely populated areas would be technologically inefficient (natural monopoly argument).

Accordingly, we have Friedman I and Friedman II. Friedman I was stated as follows: "Governments could require a minimum level of education which they could finance by giving parents vouchers redeemable for a specified maximum sum per child per year if spent on approved educational services. Parents would then be free to spend this sum *and any additional sum* on purchasing educational services from an 'approved' institution of their choice. The educational services could be rendered by private enterprise operated for profit or by nonprofit institutions of various kinds. The role of the government would be limited to assuring that the schools met certain minimum standards such as the inclusion of a minimum common content in the programs . . ."[35] (italics added).

Friedman II, a milder version of denationalization, was stated in this way: ". . . government would continue to administer some schools but parents who chose to send their children to other schools would be paid a sum equal to the estimated costs of educating a child in a government school, provided that *at least this sum* was spent on education in an approved school. This arrangement would meet the valid features of the 'natural monopoly' argument, while at the same time it would permit competition to develop where it could."[36] (italics added). It may be noted that both Friedman I and Friedman II allow parents to "add on" money to the value of vouchers they receive, to combine or meld the state's contribution for education, that is, with their own private contributions. This cannot conveniently be done now, except in the purchase of piano lessons, ballet lessons, swimming, music camps, etc. Also, Friedman II provides that the value of vouchers be determined by expenditure on elementary and secondary education in the existing local districts. We shall argue later that both of these power-oriented features violate too much the criterion of social efficiency.

Friedman claimed a number of advantages for his proposals. (1) It was held that parental choice with respect to type and quality of education would be increased. The options would be greater than those now available in most states: a single local public school (with entrance to some other public school requiring a change of residence) or a private school (which receives no public subsidy, requiring parents to meet tuition costs from their own pockets or to send their child to a school that is subsidized by religious bodies). (2) Market forces would raise the level of technological efficiency in education, in that schools which failed to provide good services at reasonable rates of tuition would lose trade and go out of business, while those that were efficient would survive and expand (up to the enrollment that represents minimum cost per student of operation). (3) Salaries of school teachers would become responsive to market forces. (4) Parents who wished to use private schools would no longer have to "pay twice" for educational services.

It is interesting that a similar plan was proposed in England in 1926 by Cardinal Bourne.[37] The Cardinal's plan would have provided that parents of children of school age (5-14) receive an annual warrant to admit their children in any recognized school in their neighborhood. The value of the warrant would have been determined by dividing total annual public expenditure on education by the number of all children of school age. In 1926, it was estimated that the vouchers would be worth £20 to the institutions that received and cashed them. It was stated that the Bourne plan would give to the poor man the same right to choose educational institutions his children were to attend as the rich and middle classes had always held. Whether the plan would have worked out in just this way may be debatable, but one can certainly agree with A. C. F. Beales, an advocate of education vouchers, when he says," . . . one of the profoundest of poverty's degradations . . . is unavailability of choice."[38] It was also stated in the Bourne plan that teachers would become more agreeable and efficient, once they felt market forces of competition. Primarily, however, the plan was advanced to relieve the financial plight of Catholic families who wished to continue to send their children to parochial schools and who were finding the cost of keeping up to the standard being set in the public sector becoming more and more onerous.

There is one clear difference between the Friedman and Bourne voucher plans. The former would have the value of vouchers (or warrants) determined by local standards of expenditure and the latter by national. There is another possible difference. One can interpret Cardinal Bourne's statements to mean that the warrants were to meet the full cost of attending *any* school within commuting distance of a child's home. (He plainly did not suggest that the warrants entitled a person to enroll a child in a residential school, like Eton and Harrow.) If this is the proper interpretation, then the Bourne plan, on the one hand, would have equalized expenditures in the state and nonreligious schools, leaving the church free to "add on" to warrant payments in its own schools, and, on the other, would have taken a giant step to give poor families choice in education. Later writers have assumed, however, that the Bourne plan, like Friedman's, would have allowed schools to charge what the market would bear, with parents being required to supplement voucher payments if they wished to enroll their children in expensive schools. This leaves education received substantially a function of parental income, of course.

Economic Efficiency. On the face of it, Friedman vouchers I and II should provide greater educational choice to middle class families than they now possess. (We assume that upper class families already have a good bit; the lower class poses a problem to which we will turn later.) A number of new private educational institutions should open their doors, and surely some of these institutions would seek to establish a certain measure of distinctiveness, in order to increase the potential demand for their services by households of a particular bent. For example, some schools might stress the outdoor life, others might emphasize painting, sculpture and music, and yet others might specialize in mathematics and science.

However, choice would develop not in a planned way but in response, simply, to market forces. Two institutional constraints might impede large-scale establishment of diversified institutions. On the one hand, state governments might be reluctant to relax controls with respect to curriculum, teacher certification, and textbooks. For example, House Bill 3843, considered in the 1970 Session of Massachusetts Legislature, provided that vouchers could be spent only in schools that were accredited by the state and that taught all subjects required in public schools of the Commonwealth. Senate Bill 1082, Chapter 2, 1970, in Michigan required that teachers in aided private schools must hold public school teaching certificates. Ohio Revised Code 3317.06(H) and Regulations states that ". . . services, instructional materials, or programs provided for pupils attending non-public schools shall not exceed in cost or quality such services . . . as are provided for pupils in the public schools of the district." In short, it is not enough simply to adopt a voucher plan and let it go at that. If the objective is to procure choice, and if this choice is to develop in the private sector primarily, then it is necessary to protect new institutions against excessive public controls. One may wonder, accordingly, if it would not be better to try to provide choice within the public sector as a conscious act of planning.

Second, diversity in educational offerings could develop under a voucher plan only if teachers were willing to see it develop. Teachers are unionized. The power of the union against a single school would be many times greater than it is against a public school system. New schools especially cannot withstand strikes, since parents would not willingly tolerate interruptions of their children's schooling. It is difficult to say how teachers' organizations would respond to the development of diversity in education.

Against these (possible) institutional obstacles, one may set the question of how effective would be market pressures in producing diversity. Do middle class parents really want different kinds of education (or educational institutions) or simply the right to try to use their *economic power* more effectively in choosing different qualities of college-preparatory programs? Probably the latter, which is to say that true diversity could not develop as long as (1) parents make educational choices for their children and (2) colleges and universities continue to specify admission requirements in terms of specific courses completed, rather than in terms of knowledge acquired (no matter how) and aptitude.

What now is the degree of choice afforded by the voucher plan to working-class parents? Such parents would have little means to supplement the value of vouchers by private payment. Those living in school districts of low assessed valuation would receive vouchers of small dollar value, moreover. Partly, then, the answer depends on whether diversified private institutions could develop in the low cost range or whether poor families would be limited to public institutions (under Friedman II).

Let us take the favorable view and say that, yes, there would be private schools to which poor parents could send their children. The matter then becomes a bit more complicated. One of the advantages claimed for the voucher plan is that it would increase technological efficiency in education: that is, schools would come to provide more learning per dollar spent in them (or collected in fees), because of competitive market pressures. The most effective (and, relatively speaking, easiest), action for a private school to take under competitive pressures is not to fire bad teachers but bad students. This is true because of the powerful effect of external economies in production of school services. Even in the public sector this is the case, even where, that is, dismissal is closely controlled. How much greater it would be in the private. Not only would disruptive, slow-learning children be got out of the way — no longer to distract the other students or to lower their norms of attainment — but the threat of dismissal would be a major incentive on the remaining students to work hard.

Would dismissal power fall on children or different classes differentially? It would seem likely, for working class children frequently appear slow and disruptive until they come to feel at home in a given school environment. Accordingly, the working class might be expected to take the brunt. Further, working class parents would be less able, probably, to make effective grievance than middle class against a school management for arbitrary treatment or against a teacher (he being backed up, of course, by his union, with its ever present threat of strike.)[39]

It would be unfortunate if the poor had their choices constrained to a local public school, probably one which had been drained of a large share of its teachers and students who were academically superior, at the same time that the middle and upper classes were being given new powers to guide the destinies of their children. This introduction of the poor into the mainstream of American education is what much recent federal legislation has sought to accomplish, though not yet with astounding success. One would not want to make a bad situation worse, and the only way out might be to have the public authorities supervise dismissal power in all institutions, public and private alike. In that case, one may again raise the question of whether it would not be preferable to provide choice within the public sector in a planned manner.

Technological Efficiency. Much of the possibility of raising the level of technological efficiency would depend on whether newly established schools could have a more highly differentiated salary structure, so that teaching could become attractive to very talented people. More money, it should be expected, would be available for the schools (1) because interested parents could add on the value of the vouchers as private supplement to publicly determined expenditures and (2) because all parents, not just public school parents, would have reason to support tax override elections for education (thus to increase the value of the vouchers themselves). The question remains, however, whether teachers would be agreeable to a more highly differentiated salary structure.

And, of course, money is only a necessary, not a sufficient, condition to attract talented people into teaching. The tasks of teaching must themselves be seen to be intellectually intriguing and exciting. The greater freedom to experiment in voucher schools would produce that atmosphere to a greater degree than it exists at present. But can competitive pressure reinforce the remaking of the teacher role? Once a parent has enrolled his child in a school, he cannot easily withdraw him — in the meantime, friendships have been made, routines established, etc. For competitive pressure to work, then, much depends on the quality of knowldge possessed by the household when it makes its choice of school. The technology-efficiency-increasing power of a voucher plan would be raised greatly, it would seem, if parents had the benefit of a "truth in education" act, under which all schools would be required to show not only what resources (number of teachers and their characteristics, library, laboratory, and sport facilities available, etc.) they intended to lay before the student but also what success they had had with students in the past, as revealed by "follow-up" reports from their graduates: which institution of further education they entered, how well they had done there, or what jobs they had gone on to, and so on. Naturally, under such a system, schools would be keen to regulate the quality of their admissions carefully, and unless Friedman's plans were modified in some way technological efficiency would be bought at a price of intensified social stratification in education.

. Two comments must immediately be made. First, the Friedman plan should not be introduced in such a manner that a larger number of private, white segregated institutions can be established. It might be desirable to require racial quotas, under which enrollment in any given school is required to conform approximately to the racial composition of the geographic area. Another approach (incorporated in the family-power-equalizing scheme) is to require open admissions. The second comment has to do with the "truth in education" feature. It is not certain that self-reporting by educational institutions can be relied upon to inform parents. On the other hand, state accreditation bodies have not shown themselves over the years to be very imaginative; further, they have grown accustomed to measuring school quality almost exclusively in terms of input variables (number of teachers, proportion of teachers holding certificates, etc.). It might be well to establish an independent, well-financed body to conduct "consumer research" in education and to see it report its findings both locally and regionally.

The last point regarding technological efficiency has to do with economies of scale. If the local district structure is to be retained (which it would not be in the family-power-equalizing plan), then we can expect most students to attend schools within existing district boundaries. Most suburban districts are not large enough to support a plethora of private institutions, especially at the secondary level, laid along side the existing public schools, without sacrificing considerable economies of scale. The Friedman plans, then, would offer a trade-off between some possible gains in effiiciency through technology and some losses through the scale factor.

Social Efficiency. Enough has been said already to indicate that the Friedman voucher plans, both of them, get low marks on this criterion. Unless the plans were modified (possibly in the ways to be discussed below), it seems almost certain that rich and middle class parents would exercise the right to add on to the monetary value of the vouchers in buying private education. Clearly, they have much more power to do this than the poor, especially the poor who happen to have large families. It is very likely, then, that quality of education obtained would come to bear an even closer positive relation to household income than it does now.

Modifications of Friedman Vouchers: Pauly and Otherwise

An interesting addition to the discussion has been made by Mark V. Pauly.[40] He has proposed that the value of vouchers paid to households be made to vary inversely with household income. ". . . a scheme in which the community agrees to pay some fraction of the cost of *each unit* of education purchased by the parents could lead to optimality . . . The optimal structure of these payments is not, however, one in which the community pays the same fraction of the per unit cost at all income levels, but rather it is one in which the fraction paid by the community varies inversely with income."[41] Such a modification could reduce the effect of Friedman vouchers in affecting social efficiency adversely.

Another modification would be to restrict Friedman vouchers to secondary schools and above, while at the same time introducing the "truth in education" feature noted above. There are several arguments in support of this modification: (1) It seems likely that parents are more keen to make choices about education *after* the primary level is passed. Some evidence is given by the fact that many rich and upper middle class families in New England use the local public primary schools, even in the central cities, though they choose private schools for their high school youth. The same pattern prevails in the United Kingdom. (2) The "truth in education" feature is desirable to obtain technological efficiency *and* to allow parents to exercise their access to economic efficiency intelligently. But we do not want to reduce the effectiveness of the educational system in discovering and nurturing talent among the children of the working classes. Introduction of the voucher plan at the secondary level would allow a beneficiary-oriented sharing of costs of that level of education between the non-parent taxpayer and households with school-age children. If the Pauly modification were introduced, the sharing could provide rough equity. Sharing of costs would release public funds from secondary level to strengthen a publicly administered primary system, a chief purpose of which is to discover talent and salvage it while it is still capable of being salvaged — among all the classes. If a real effort were made to eliminate the effects of home background on primary school success, then selectivity, parental choice, and institutional competition at the secondary level might be appropriate stimuli toward higher educational performance, won at no great cost of equity. The use of contract schemes, to be discussed below, would be one device to raise the efficiency of primary schools in getting a closer fit between true abilities of students and actual performance.

Family Power Equalizing

This is a somewhat more complicated proposal than those we have so far considered. Developed by Professor John E. Coons, School of Law, Berkeley, and his colleagues, the plan is not necessarily in final form, but the main outlines of it can be seen.[42] The plan intends to give parents options in the education of their children such that households can select a school at one of four expenditure levels. Tentatively, these expnditure levels are $500, $800, $1,100 and $1,400 per student in primary grades and $800, $1,100, $1,400, and $1,700 in secondary school years. The household, it is held, would have one or more schools available to it at each expenditure level administered by public authorities. It is also expected that most households could choose among a set of privately administered schools, the set including schools operating at each of the different expenditure levels. (School districts, however, would disappear and so would local school district taxes.) Parental choice could be exercised, then, as between different expenditure levels and as between public and private institutions.

Both public and private schools would be subsidized by the state governments from general revenue sources.[43] However, parents, even very poor parents who chose the lowest expenditure type of school, would make a direct financial contribution toward the education of their children. The contribution is in the form of a weighted progressive income tax. For example, suppose a parent has a taxable income of $5,000. If he decides to send his children to the lowest expenditure-category school ($500 a student a year in elementary and $800 a student in secondary), his school tax might be equal to, say, 2.0 percent of his taxable income. If he chooses the highest expenditure category ($1,400 elementary and $1,700 secondary), his tax might be at a rate of 5.5 percent of taxable income. Note that both the amount of school tax paid and the rate are variable as the parent picks a different expenditure level for his children's education.

Call this first parent Mr. Jones. Now, let us consider Mr.

Smith, and suppose that Mr. Smith has a taxable income of $15,000 a year. If Mr. Smith chooses the lowest expenditure schools for his children, he may pay school tax at the rate of 3.0 percent, while if he picks the highest expenditure education he may pay tax at the rate of 8.0 percent. Suppose that Jones picks the 2.0 percent rate (and the kind of schools that such a rate "buys") and that Smith picks 8.0 percent. The extra $1,100 that Smith is paying (Smith pays $1,200 as compared with Jones $100) reflects three things: (a) that Smith picked a more expensive school, (b) that payment is related to income, Smith's being the larger, and (c) that the rate of school tax is progressive.

This is one way to define a price, and, given that we are dealing with a subsidized activity characterized both by external economies in production and by external economies in consumption, it is a rational way. In classical public finance theory, it is shown that the quality of public sector goods can hardly be expected to satisfy anyone. Most people will want either more or less of the given goods or services. The voting mechanism at best is intended to determine a single level of output for a certain service provided by a certain government which is tolerably inoffensive to the majority. Coons makes this point: why not cater to differences of taste within the public sector, at least for services like education where, first, external economies in consumption dictate that we cannot leave matters about minimum levels entirely in parents' hands and, second, where parents, willy nilly, are going to intervene on matters affecting their progeny? The trick is to arrange that they intervene not dysfunctionally with respect to the external economies of production and this means in the future they come to accept more mixing of the social classes in schools and in school programs.

Conventional wisdom answers that household choice is already provided by the system of local government (which governments provide those services, after all, in which differences in tastes are most urgently felt by households), because the household can always move to that community which meets but does not exceed its required standard of service.[44] This solution is inconvenient for all families and infeasible for some—especially the poor. Coons breaks the nexus between consumption of such things as school services and place of residence. His definition of price, moreover, avoids the irrationality of having the price paid for education a function primarily of the amount of assessed real property per student in the hands of the school district. If a private power plant is placed within district X, why should its residents have the price of their children's education reduced, say, three quarters—the connection between economic location of electrical generating capacity and priority for distribution of educational resources (or local tax relief) is not easy to discover.[45] Coons has carried thinking about allocation of public sector goods and services a considerable step forward.

It was said earlier that payments for school services would be made under a "weighted" progressive income tax. We have considered the progressive feature; what, then, about the "weightedness?" This refers simply to the fact that if a family has more than one child in school and if these children attend schools of different expenditure levels, the tax rate charged to the family will be the average of the rates fixed for schools in the categories attended by their children. Actually, it would seem unlikely that most families would practice such invidious discrimination as to send some of their children to expensive schools and some to cheap, unless, *mirabile dictu,* it turned out that high status education, namely, college preparatory, happened to be generally cheaper than low status kinds—vocational, artistic, scientific, and the like.

It is instructive to consider the differences between family-power-equalizing and Friedman vouchers. There are, importantly, two. First, family-power-equalizing, like Pauly's variant of Friedman vouchers, provides a public subsidy that is functionally—and inversely—related to family income. In truth, the distinction between FPE (to use a common abbreviation) and Friedman vouchers is even more interesting than this, in that the amount of subsidy paid a household depends not only on its income (however the progressive tax structure may be laid out) but also on its choice of quality of education. That is, the actual and relative amount of subsidy may be different for different expenditure categories of school chosen, and these latter differences may not be related to household income or size in any obvious or simple way. Indeed, these latter kinds of subsidy valuations are to be empirically determined to assure that some rich and poor families choose expensive schools and that some rich and poor families chose cheap schools—in other words, to provide intermingling of classes within the schools.

The second distinction is this: Coons would allow no private supplements to education expenditures, whereas Friedman sees such private supplements as a vital and necessary part of his plan. Under the Coons arrangements, *schools* would receive the stated amount known to parent and school alike—$500 to $1,400 per student in primary schools, depending on expenditure classification chosen by the school—neither more nor less for each student enrolled. The state, of course, would make up the difference between the stated fee and the yield of the income-determined school tax rate on a given household's income—or receive the excess yield when the household was very rich—but it would pay only the amount of the total fee per student to the school. The household itself would pay nothing directly to the institution. This leaves schools indifferent with respect to fees as between choosing a student from a rich household or a poor one. The provision promotes racial and class integration. But the Coons "no-add-on" feature means that rich families cannot meld public subsidies for education with their own large financial resources to commandeer an unusually large amount of educational resources for exclusive service of their children—not with respect to full-time, formal educational institutions, at least.

It is also instructive to examine the roots of the FPE plan. Coons and his co-authors, William Cline and Stephen Sugarman, developed a lengthy case to indict most existing state school finance plans as unconstitutional. The complex argument emphasizes several factors: that all children are both poor and disenfranchised, thereby deserving special judicial attention under the equal protection guarantee of the Fourteenth Amendment; that education should be an interest judicially favored; and that existing structures for its provision are irrational in the sense that the states have burdened local school districts with the uniform duty to provide education, while leaving those districts grossly unequalized in economic power to carry out that uniform purpose. The results of present arrangements are that poor districts pay taxes at high rates to obtain low-grade school services and rich districts pay taxes at low rates to receive superior services. It is, practically speaking, impossible for poor districts to run good schools. Now, assuming that in most cases poor districts (in terms of local taxable capacity per student) are populated by poor households and rich districts by rich, the pattern of discrimination becomes clear: poor districts cannot buy good educational services on behalf of their inhabitants nor can the residents of those districts provide themselves with such services by private means.

As a guiding principle, Coons, et al., developed the following proposition: "the quality of public education may not be a function of wealth other than the wealth of the state as a whole."[47] The proposition would be satisfied, of course, if the state established equal per student expenditures in all of its public elementary schools, public secondary schools, etc. But Coons, et al., see this as violating another important (though non-constitutional) principle, that of "subsidiarity." "Subsidiarity" is the value we invoke when we prefer local control, decentralization, and district choice. The important thing, then, is to retain the possibility of district choice, but to free that choice of the influence of local taxable wealth. This could be done by a "district-power-equalizing" (abbreviated as DPE) plan, under which school districts choose a quality of school program, measured as expenditure of $x_1, x_2, x_3, \ldots$ dollars per student per year, with each different quality being associated with a specific local tax rate. The schedule of school expenditures vs. tax rates would be positive and would be uniform for all districts. Call district A rich and district B poor. If rich district A decided to spend $900 per student in its elementary/secondary schools and if the associated tax rate was $2.50 on $100 of assessed valuation, then poor district B could get the same $900 for a $2.50 rate. If both wanted a more expensive program, say $1,100 per student, then the tax rate might go to $3.00 but the rate would be the same in the two districts. For the scheme to work with absolute precision, very rich districts not only would not receive a state subsidy but would make a net contribution to the state school fund for redistribution to poorer districts. The magnitude of necessary redistribution of this kind could be minimized either by redrawing the boundaries of the richest and poorest districts or by withdrawing industrial and commercial property from the local base.

While DPE would be a vast improvement over existing state finance plans, it has its shortcomings. Poor families living in poor districts are still left poor. We cannot hold that the fragmentary evidence of some poor districts' being willing to have high tax rates is sufficient to make us certain that poor families in general would see themselves able to buy high-grade schooling for their children. Big cities have high non-school costs in the public sector; these could be said to eat away the local taxable resources for education. It is difficult to accommodate this problem of "municipal overburden" in a DPE formula.[48] DPE was subjected to the criticism that the authors were unduly sensitive to wealth-induced differences in provision and callous toward place-induced (geographic) discrimination. "One difficulty is that children whose families have identical (let us say rather low) incomes and identical (let us say rather avid) tastes for education, and who differ only in where they live, may under a district-power-equalizing system receive substantially unequal treatment depending upon the levels of sacrifice for education which are *collectively* (i.e., politically) preferred by the voters in their respective districts of residence. Here is a systematic, state-sponsored discrimination among the possibly favored class of children, affecting their almost certainly favored interest in education."[49] The illustration can be extended to consider the case of a district which voted minimum (possibly zero) expenditures for schools. The richer parents would turn to private schools, whereas most of the poor could not. Place discrimination, even under DPE, would be turned into wealth discrimination, violating the main proposition, i.e., wealth is not to affect the quality of education.

FPE stands up better, though admittedly not perfectly, to these kinds of problems than does DPE, so what was first put down as a kind of afterthought in Coons', et al., *magnum opus* on DPE has become (rightly, one thinks) their main policy prescription. It is as if Coons and his associates had first seen the existing state financial arrangements as the tail wagging improperly the dog of the American educational system and had set out to give the dog a new tail. Now, they have decided we need a new dog. The question remains, will it bark better than the old one?

Before we make a response (tentative, of course) to that question, let us consider the nature of the family-power-equalizing plan more carefully (recognizing that the proposal may yet be modified in its details). Several principles undergird the plan, and some, such as the desirability of offering householders choice of educational program, the undesirability of allowing rich householders choice of educational program, the undesirability of allowing rich households to "add on" their private resources to the value of public vouchers, etc., have already been mentioned. Others are worth noting. (1) All households, even the poorest, are required to make a private contribution toward the education of their children, and the idea behind this is that people are likely to value more what they directly pay for than what they do not. (2) Direct costs of education (as distinct, say, from indirect costs like income foregone of students, which in the nature of the case are likely to be borne mainly by the student and his household) are to be shifted under family-power-equalizing to some degree from non-parents to parents, though in a progressive way. This would probably be most noticeable in the case of upper middle class families: non-parents would be relieved of *local* school taxes while parents would face the choice of paying $1,000-$2,000 a year (the actual figure would depend on the household's adjusted gross income and on the rate structure for parental contributions finally voted) to government for entrance into a public (or private-aided school) or of meeting the whole bill of their children's education in a private unaided school. On the other hand, family size would not affect the contribution as long as public or private-aided schools were used. (3) Parental judgment is to play a somewhat larger role in selecting programs for students. The authors of family-power-equalizing appear to hold the view that parents have knowledge of their children's interests and capabilities that the public school system, as presently organized, does not easily and frequently recognize. They profess to believe that poor families, including those in which the adults have had only the smallest amount of schooling, will recognize the great bargain offered them when they choose an expensive, rather than a cheap, program for those of their children that can profit from it.[50] But they buttress these assumptions with the requirement that schools furnish a great deal more information to their clients—and prospective clients—than now they do. As a minimum, schools would be required to provide prospective clients with information on expenditures per student, religious affiliation, curriculum specialties, maximum enrollment fixed by statute, and average score of students on achievement tests. (Such tests would be conducted each year in all public and private-aided schools and the results by school and by grade within a school made a matter of public record.) Information might also be provided on physical facilities, size and characteristics of faculty, and special methods of instruction employed, if any.

Certain more detailed features of the plan deserve attention.[51] The Superintendent of Public Instruction would be charged to see that a variety of public schools to compete with the private at all permitted levels of spending was available throughout the state. The superintendent would enforce minimum standards of facilities and staff in the public schools of the state. Private schools would be charged to receive no income other than credits from the tuition account, except with respect to certain closely defined categories of revenue (e.g., grants directly to the institution from the federal government). Where private schools receive services at less than fair market value, the excess of such market value over wages actually paid would be reported, and that sum would be deducted from the tuition credit of the schools. No parent would be taxed an amount greater than twice the expenditure level of the school(s) he chose for his child (children), or the weighted average thereof. What this latter point means is that small rich families would subsidize everybody, to a degree, but the dollar magnitude of the subsidy would be small, relative to the nation's education bill. Schools would be allowed to make contracts with each other for services. This means that a teacher might teach in more than one school at a time, and a student might work in more than one school. Schools could also issue contracts to private, non-school parties for services.

Admissions is a special matter, and, as we shall see later, a special problem. Family-power-equalizing would arrange things in the following ways. Parents would be provided a list of schools in their area or to which transport would be available. The list would indicate the kinds of information about schools mentioned above. The list would include both public and private-aided schools. Parents would make known their first preference for each of their children, as well as alternative choices. Each school would have to *accept any child* for whom it had a place, though it might counsel a parent against entering his child in the given institution. If a school had more applications than it could accommodate, it would determine the names of accepted candidates by lot, having first given preference to students who were in the school the previous year and their siblings. The intent of these provisions is to let parental judgments about a child's capacity, motivation, and interest prevail over the professional's, in the final analysis, and to reduce racial, economic, religious, and social segregation of students. Up to this time, the family-power-equalizing plan appears to be silent in matters of student dismissal: grounds for dismissal, appeal machinery, possibilities for readmittance, etc.

Economic Efficiency. How well would FPE serve the objective of getting a closer fit between educational outputs most highly desired by parents and the actual outputs of schools? In part, the answer would depend on one's subjective view of educational processes and institutions. No doubt, there exist educators who feel that substantial variety can be provided within a single institution — this notion is fundamental to the strong support given in America to the "comprehensive school." If this view is correct, then variety as represented by differences in expenditure level, which is to say differences in generalized quality, is all the additional variety one can ask for, and FPE *might* do the trick. Even under this favorable view, however, one must ask: would any parent choose any but the highest expenditure level school for his children?[52] Let us consider the problem as it might apply first to poor households and, second, to rich.

Any household, poor or rich, rationally would weigh only the marginal cost of moving up from a low expenditure to a high expenditure school. The way to assure that all parents of whatever income level do not choose the most expensive schools is to see that these marginal differences are significant for members of the given income class. If, for example, the dollar choices (household contribution) between the four categories of schools (spending, as noted $500, $800, $1,100 or $1,400 at elementary grades) were $50, $150, $250, $350, respectively, for a $3,000 a year family, the $300 difference between the cheapest and most expensive school would probably discourage most low-income households from picking the most expensive. Only a few of the most dedicated would squeeze their budgets and sacrifice so much for education. But are we then meeting the objective of the proposition that underlies FPE, namely, that differences in wealth shall not influence choice of educational opportunities? We are but only in the relative sense and only if, say, rich households feel similar constraint about choosing the most expensive as compared with the cheapest schools.

So let us see what range of prices one is able to specify for rich households. The household costs of attending a minimum-expense school must be at least slightly greater in absolute terms than the costs for the same type of school laid on a middle income household—otherwise, the prices would not be progressive.[53] This condition puts a kind of *floor* under the price scale offered rich families. The *ceiling* of prices for the rich is functionally related to the costs of attending unaided private schools. Taking account of the present level of fees, etc., if a rich family was told it would have to pay $5,000 to government to enroll its child (children) in a public or private-aided school, it might well respond by opting out of the public system altogether. Only a very large rich family would have much financial reason to feel differently. It is not good enough to say that the rich use public schools where public schools are good—which now means that the rich use suburban schools — because presently the rich buy a style of life and an associated package of local public services through the purchase of housing. FPE breaks education out of this package by requiring that public school attendance (or private-aided school attendance) entail a substantial fee, which fee can be foregone if the parent chooses a wholly private school. The latter choice thus becomes marginally more attractive, and, since the rich live in segregated areas, wholly private schools could spring up conveniently near their neighborhoods.

To keep the rich in the system, then, requires that the top price not be very high. Given that the price to rich families of the lowest cost school is itself inflexibly determined, as noted, the range between prices for cheapest educational services and most expensive is unlikely to be greater, say, than $2,000. This is not enough to dissuade a rich family from choosing the most expensive kind of schooling, especially if it has several children of school-going age.

Accordingly, the range of prices laid before the poor cannot be very wide either, relative to their incomes; otherwise, household income, as distinct from such factors as parental tastes and interests and children's aptitudes, would be seen to play a disproportionately greater role in influencing educational choices as we moved down the income scale, contrary to the guiding principle of FPE. And suppose that wholly private schools were banned, so that the lid on the very top of parental contributions, in effect, was taken off. It would still be a major feat of social engineering to discover that set of prices which minimized (or brought down to a tolerable level) the influence of household income on educational choices over all income classes.

Moreover, there are those, the author included, who feel that within-school variety of programs is no substitute for between-school differences. In other words, what we may want to have is greater specialization by type of institution rather than just by quality of institution. Take the example of instruction in the arts. A teacher of painting in a comprehensive high school, unless it is such an extremely large high school that four or five full-time members are found in the fine arts department, is bound to feel lonely in the professional sense and is likely to regard himself as no more than an ornament to the "regular" programs. Further, only the most common of the arts will be treated in a comprehensive school: drama, painting, band, orchestra, possibly printing, but not ballet, sculpture, chamber music, organ, Oriental music, African music, calligraphy, poetry writing, playwriting, mime, etc., except as these forms of creative expression are touched on in a fleeting and non-professional way. Yet, creative talent blooms early in youth, and its flowering, more than in the case of verbal skills, would be no respecter of classes. A high school of creative arts would offer economy of scale in laying before youth the range of aesthetic expressions; the staff would reinforce and stimulate each other, provided all had both motivation *and* talent, and the administration could reasonably set standards of professional knowledge—as well as of teaching skills and of maintenance of discipline—to regulate advancement of staff. The same case for specialization by type of high school could be made in such fields as mathematics/pure science, mathematics/applied science (technology), social science, commerce, construction trades, machine trades, and languages (including computer languages). It could well be that one of the roots of student unrest is vacuity of courses in the last years of high school and in the first year or two of college. The underlying reason for the malaise may be that in America we delay too long that necessary measure of specialization to serve a student's aptitude and stimulate his interests.

It might appear that FPE would be conducive to the development of such a necessary degree of specialization, but the difficulty is open admissions. Once a student is entered in a school, he is not easily changed therefrom, so an initial improper sorting will have lasting effects. Since external economies of production are important in education, the actual standard of work done in what might appear to be specialized schools would become general. This is more or less admitted by Professor

Coons when, speaking of the processes through which open admission would work itself out, he writes, "The overall consequences would probably be more stably integrative for densely populated areas than any of the administrative proposals with which the author has been associated or is familiar."[54] Though the quotation refers to integration of races and classes, the feeling one gets is that it might refer also to aptitudes and interests. It may well be true that specialization of program—and all the benefits which might flow from such specialization—requires admissions standards, differentiated of course, by the particular emphasis of a given school. This would probably yield quantitatively less race and class integration than FPE with open admissions, but there could well be more class and racial tolerance. After all, it doesn't accomplish much to have blacks and whites in the same school if most of the whites are in the college preparatory program and most of the blacks are put in the shop. Under specialization, whites and blacks having similar strong interests would have a chance to work side by side.

Yet a better solution might be to rely on school advertising and guidance to improve initial student (parental) choice and then to allow a one-year tryout for any student (or his household, if final choice is not the student's) who is sufficiently determined and confident to seek to enroll himself against school authorities' statements that he is probably not qualified to work in the given institution. This would reduce reliance on one-shot tests to screen applicants, which is generally a risky business anyway.

In any case, we are left in FPE primarily with choice in terms of expenditure (= quality) but not much in terms of type of program. This at least is likely to be a greater degree of real choice than decentralization (alone) would give, and it is provided in a much fairer way than under Friedman vouchers. However, what we are doing is relying to a greater degree than at present on parental choice and less on the judgments of professional educators, school boards, state legislatures, the Congress, etc., to make choices about the kind and quality of school services that should be laid before a given student. We all now recognize that different students "require" different amounts of educational resources, with programs for the deprived, the handicapped, and the vocationally minded being relatively expensive. Better knowledge of education production functions should someday guide us to make more sensible and sophisticated expenditure differentials. Can parental judgment do as well in allocating students to programs as the professionals and public authorities? No one knows, and no one can know until we have some experimental program of FPE type.

Technological Efficiency. To try to assess FPE in terms of technological efficiency is an exercise in raising questions that only experience of structural reform could possibly answer. The substantial range in expenditures per student (low-cost schools vs. high cost schools), together with the autonomy of the administration of the individual schools, might break the present bland uniformity that still characterizes teacher pay arrangements in the United States. One would hope to bring top rates up to the point where a talented person would not mind "being a teacher all my life." On the other hand, teachers' unions might be in a stronger position to bargain with single schools than with school districts. This might result in an undue diversion of school budgets into the teachers' salary item and prevent the introduction of more capital goods into instructional processes.

What about the effects of reporting of test scores and interschool competition? Basically, the results might be to improve the quality of work in the more academically oriented schools, while leaving schools that serve the non-academic (i.e., those students who do not plan to go to four year college) unaffected. Parental choice under a system of graded fees would probably act in a way to segregate serious academic students from the non-serious. This would be even more likely if the schools were required to report the proportion of their expenditures laid on instruction vs. the proportion put on extra curricular activities, etc. A well-to-do family might then choose, for the less intellectual of their progeny, an expensive school, but one that emphasized social life, sports, and so on, to avoid invidious comparisons within the family about the quality of schooling bought for different children. The more academic schools might use their new autonomy to build links with nearby colleges and universities, with provision for the sharing of teaching services between the institutions. This might help to remove the status disparity, under which work in college/university is regarded generally as honorific while work in schools is held to be plebian. But whether these things will actually come to pass is unknown.

Presently, there is beginning to be some sharing of services among school districts. For example, a successful new program launched under, say, Title III of the Elementary and Secondary Education Act, might be spread to neighboring districts through contractual arrangements. The sponsoring district gains a certain amount of prestige when this happens. The forces of competition might encourage the development of local monopolistic practices and protectionism, rather than the sharing of exceptional services (possibly underutilized in the single school) from one institution to another.

A concern might be felt about rewards in the new competitive system: who gets them and how quickly? First, about the schools and the teachers. Do schools that do well, as measured by test results and waiting lists, have the chance to upgrade themselves into some higher category (=expenditure class)? Apparently not, because this would be equivalent to breaking a contract with the parents of students already enrolled.[55] Accordingly, the most successful of teachers would probably bid their way up to the top of the vertical hierarchy of schools (by expenditure status). This is not exactly conducive to building institutional strength in a given school. However, the availability of many schools in high density areas like central cities might draw superior teachers to downtown neighborhoods where promotion opportunities would be good. Further, the great range of choice of schools might draw intellectually avid parents back to the cities. The cities could finally profit, as they long should have been doing, from economies of scale in the social sector.

It is difficult here to do more than speculate, but one final point is worth noting. To make dramatic changes in educational production functions such that substantially greater outcomes are obtained may call for access to resources far beyond the reach of the single school. FPE is no substitute for action at the state level—to see that talented people enter teaching, that they are well trained, that services of specialists are available to schools, possibly under state-financed programs ("aid-in-kind"), that educational research is well financed (so that the struggle to find out useful things about learning processes may continue), etc.

Social Efficiency. FPE seems by far the fairest of the structural changes we have considered so far—from the point of view of parents, at least. If parents want more expensive education for their children, they must find some extra money to pay for it.

But because education is important and is, say, in a class of favored interests, it is heavily subsidized by the state. To recognize social benefits of education, all taxpayers contribute toward its support at the state and federal levels, though nonparents might no longer pay at the local. Further, because not only is education favored, but so also is the class of children, fees are steeply progressive with respect to income. So far so good. By the criterion of cutting sharply the nexus between quality of education and wealth, FPE represents a great advance. Things are not necessarily so rosy when we look at the matter from the point of view of the student himself. An intellectually avid student may have parents who do not care. This argues for allowing a degree of student-initiated mobility among schools, supported by merit scholarships. This could be an important matter, since the expenditure differences per student are much greater in FPE than our public education system is now seeking to provide—within, that is, any one state.

However, it is worth noting that rewards for good work in school are themselves skewed in their distribution to the social classes. Take first an upper-middle class boy. If he obtains high marks, he obtains his choice of entering several well-regarded universities or four-year colleges. If he gets poor marks, he may be disbarred from accompanying his friends in that adventure. This reward/penalty for equality of school work has been a powerful incentive for middle class youth to work hard. Take, now, a poor black who is getting C's and D's. To move up to A's and B's may be difficult. Anyway, the young man may not see much point to trying to enter a four-year college or university populated largely by whites. However, assume the student could move up to B's and C's, and complete the high school program. There is little reward, unfortunately, in making the improvement. He would obtain the same job, if any, in either case. Differentiation of the reward system by class lies outside the narrow concern of FPE, strictly speaking, but it would be possible to arrange things, as we shall see later, such that rewards are widely available. If such changes were made, FPE itself would work better.

Contracts

In this case the seminal statement is James S. Coleman's article "Toward Open Schools," in the journal *Public Interest*.[56]

The basic idea is that schools are changed from being self-contained cost centers for instruction to "open" institutions. Parents could choose whether to have their children taught various subjects (1) by public school teachers in their "home base" school, (2) by private contractors operating in the public school, or (3) by private contractors stationed outside the given public school. Contractors would be paid on the basis of results obtained in student achievement, as measured by standardized tests. Schools could be required to provide released time and access to private contractors.[57] For example, ". . . the teaching of elementary-level reading and arithmetic would be opened up to entrepreneurs outside the school, under contract with the school system to teach only reading or only arithmetic, and paid on the basis of performance by the child on standardized tests. The methods used by the contractors may only be surmised; the successful ones would presumably involve massive restructuring of the verbal or mathematical environment . . . The payment-by-results would quickly eliminate unsuccessful contractors, and the contractors would provide testing grounds for innovation that could subsequently be used by the school."[58]

More diversified contractual offerings could be provided at high school level. Controls could be established to assure that contracting was not a means to establish a greater degree of social and racial segregation. Community groups could be encouraged to bid for contracts under which one of the purposes might be to promote integration in extra-curricular affairs, etc.

The idea is catching on. In Texarkana in 1969 Dorsett Educational Systems, a private company, entered into a contract with the Liberty-Eylan School District of the following nature: "If the company (Dorsett) can raise the reading and mathematics level of the students who need the most help . . . by one full grade level in 80 hours, it would receive $1 per hour per student. If it succeeds in 60 hours or less, it can make as much as $110 a student. If the job takes 105 hours or more, payment is reduced to $60 per student. If a student makes no progress, the entire payment for the student is forfeited."[59]

Coleman explained the advantages of the contract system in the following terms. The plan " . . . allows the parent what he has never had within the public school system: a freedom of choice as consumer, as well as the opportunity to help establish special purpose programs, clinics and centers to beat the school at its own game. It allows educational innovators to prove themselves, insofar as they can attract and hold students. The contract centers provide the school with a source of innovation as well as a source of competition to measure its own efforts, neither of which it has had in the past. The interschool and interscholastic academic events widen horizons of both teachers and children, and provide a means of diffusing both the techniques and content of education. . . ."[60]

Economic Efficiency. The first thing to note is that Coleman contracting definitely conceives of the public school system as remaining in existence and of providing "home base" schools for students. Indeed, successful innovations may be copied and taken over by the public schools from the private entrepreneurs. It is thus hard to see how private contractors can undertake large-scale physical investments. Political uses aside, the Pioneer Palaces of U.S.S.R. offer students an opportunity to explore their interests in scientific, technical, and aesthetic fields that is probably unparalled in the world. As long as contractors are dependent on local governments to renew contracts and provide them access to students through released time, it is unlikely that they will build many well-equipped permanent contract centers. Similarly, it is unlikely in view of all the uncertainties that contractors can gain a great degree of continuity of staff, especially if they seek, as they should, highly talented people. Accordingly, though the contract system would undoubtedly offer a better fit between educational products that are most highly valued by households and services actually received, it would do so under the constraint of a low threshold of capital investment and under the further constraint of contractors' having little means of building on experience acquired through long service of their staff members.

Technological Efficiency. More than the other structural changes we have considered, the contract plan should allow an exploration of new approaches to instructional processes, subject to the proviso, as already noted, that the exploration not require heavy investment in physical capital nor continuity of experience in the contractor's staff. It should also be noted that contractors cannot be expected to provide large sums of money for basic research in educational methods, unless, of course, some assurance can be given that contractual arrangements can be maintained over the long period. At presently envisaged, contracting would allow testing only of approaches that are already known about under the existing state of research of learning processes, student motivation, etc.

Social Efficiency. It would appear that the Coleman contract plan would place the responsibility for arranging contract services on the present local school authorities. This would leave the relation between educational opportunities and wealth as they are at present, at least with respect to levels of money expenditure. However, it might well be true that districts could spend whatever funds they have more effectively through partial reliance on contractual services than if all expenditures are made in the public school system. It might also be true that this kind of advantage would be gained to a greater extent in poor districts than in rich. If both of these points were borne out, the relation (inverse) between educational opportunities and wealth would be moderated.

A Possibly Useful Combination: Family-Power-Equalizing and and the Contract System

It is possible to make combinations of the proposals for structural change that we have been describing. One such would be (1) to adopt family-power-equalizing grants as the general arrangement and (2) to allow families to elect to take a share of their entitlement in vouchers to be redeemed in the purchase of services from state-approved educational contractors. A sliding scale of contract entitlement might be employed, both to protect the child in terms of his receiving a minimum education program and to offer flexibility in choice of services to intellectually avid parents. For example, suppose under FPE a household chose the minimum tax rate and received an entitlement to enter their child in the lowest cost school ($500 per student per year at elementary level, $800 at secondary). That household might be entitled to receive no more than 20 percent of its entitlement in contract vouchers.[61] Now take the case of a family that opted for the highest tax rate and gained entry to schools with $1,400 at elementary and $1,700 at secondary levels (if all the value were used to obtain admittance in a single school). Such a family might be able to claim 50 percent of its entitlement for contract services. No family, of course, would receive actual cash. However, the higher the tax rate chosen, the more expensive school, *and* the more flexibility in purchase of educational services a household would obtain.

As compared with an unmodified FPE program, the flexible family-plan-equalizing scheme (call it FFPE) would appear to offer the following advantages: (1) the amount of choice in education would be substantially increased; hence, the level of economic efficiency would be raised; (2) it would be less likely that families uniformly would choose the most expensive schools (the problem we dealt with at some length above, in terms of the difficulties associated with developing a tax structure to ration educational services independently of household wealth), since many families, one might suppose, would elect to use a cheaper "home base" school in order to have entitlements to design special programs for their children under what could be called a "building block" approach; (3) households could obtain the advantages of specialized secondary institutions without having to breach the education establishment's commitment to the comprehensive high school.

As compared with the simple contract approach, FFPE would be likely to provide these gains: (1) The contractors would be freed from dependence on local school districts for renewal of contracts and for the provision of released time. They would deal directly with parents, having first obtained state approval for the relevance and quality of their offerings. It would, of course, be incumbent on them to provide their services at times that did not conflict with regular school programs or to make an individual arrangement with a school for the release of a given student. In any case, however, the market would be opened in a regular and continuing way, and contractors would gradually come to make appropriate investment in physical plant, training of staff, and applied research in education to exploit more thoroughly the opportunities for obtaining advances in technological efficiency. The continuity of the program and the freedom from arbitrary bureaucratic decisions of local government would make it feasible for contractors to put substantial investments into the quality of their services. Once such investment is made feasible, competition should dictate that it is actually carried out. (2) The provisions that the amount of state subsidy to a household (a) is inverse to household income and (b) is wholly free of extraneous matters, such as the value of local assessed valuation per student, introduces greater equity than was originally provided in the contract plan.

It might be objected that the combination plan loses an essential equity provision of FPE, namely, that parents do not "add on"[62] to the value of their entitlements in purchasing educational services. Under FFPE, it is true that it would be possible to supplement costs for contracted services by private household contribution. To require no "add on" under our suggested modification would not be administratively feasible. The difference between the original proposal for family-power-equalizing and the modified plan is not so great on this score as one might first think: after all, no one could bar a household from supplementing its FPE schooling by wholly private contributions for contractual services. The lack of government commitment toward contractual services would simply mean that they would be of lower quality and, moreover, less well distributed among the social classes.

THE SPECIAL PROBLEM OF VOCATIONAL AND TECHNICAL EDUCATION

Vocational and technical education is commonly regarded as expensive. It does not have high status in our country. Unless special attention is given to its provision, it is likely that the supply and quality of this kind of schooling will suffer under the structural changes we have described. Yet, the availability of this kind of schooling in good quality is exactly what is needed to provide incentives for all but the most ambitious of poor youth to do well in their early years of general education. (The problem of a class-differentiated incentive structure for students was noted above.)

In his original statement on voucher plans, Friedman suggested that government provide loans to students for their specialized training, with repayment related to the estimated extra income they would earn for having received the instruction.[63] Unfortunately, this laissez-faire approach to the institutional structure under which training is provided may fail to attack the problem of quality of training in sufficient measure. Let us consider the problem in more detail.

What are the difficulties in the present arrangements for supply of skill training in public, formal institutions?

1. Public institutions, especially those offering instruction above secondary level, are subject to extreme political pressures. It is a popular thing for a local authority to establish, say, a new junior college with a vocational wing in a district that has none. Yet, proliferation of institutions and of programs within

institutions can quickly lead to a low rate of utilization of specific courses.

2. Drop out rates in such public institutions are notoriously high. Are these high drop out rates related to the control, i.e., public sector control, of training institutions? It is possible to think so: (1) Because there is no legal linkage between the training institutions and employers, the student cannot be assured of a job even if he completes the training program successfully; hence, when the student becomes temporarily frustrated in his academic program, he may view the cost to himself of dropping out as rather low. (2) Since employers, i.e., those persons who have the most intimate knowledge of what is required of new entrants to the work force, do not select students for admission to the training institutions or for assignment to specific programs within the institutions, and since the previous education of students, by which they establish their eligibility to enter the training institutions, has been general in nature, it seems rather a matter of chance whether a given student really has the motivation and aptitude to learn the trade he is studying; hence, an improper fit between the characteristics of a student and the learnings expected of him may force some students out. (3) Students who find their work in training institutions administered by public authorities either too easy or too demanding cannot easily shift to another level of study; hence, certain ones of them would be likely to become bored and drop-out prone for lack of interest, while others would be forced out by academic failure. The tendency of public institutions toward rigidity of program is not a necessary feature of their existence, but is possibly related to the fact that public institutions in the education and training fields are seldom scrutinized closely with respect to their own productivity and cost-effectiveness. (4) The jobs for which the students are trained are often monopolized by trade unions, membership in which may not be open *de facto* to new graduates.

3. Training institutions are expensive to operate in the nature of the case. As compared with general instruction, training institutions require more capital facilities (e.g., laboratories and shops); they also require a greater quantity of consumable materials of instruction. Teachers in training institutions, those who are competent anyway, have good opportunities to work in production rather than in teaching, and they must be paid high salaries, as compared with arts teachers, to retain their services.

Thus, it is possible, speaking realistically, to run high-grade training institutions only when those institutions can be made to operate efficiently. This means that courses must be filled with the maximum number of students who can be taught effectively in a given subject and that the drop-out rate must be held to a low point. Yet, as we have indicated above, it is just these kinds of efficiencies that public institutions find it difficult to provide.

The most common alternative to training conducted by public institutions is training provided by the employer in the work place. Now, as we have said above, a certain amount of on-the-job training is characteristic of every human economic activity. The question, however, is whether the employer should bear the major share of the responsibility for the development of work skills in the trades and in the technical fields. Apprenticeship is the form in which this employer responsibility has been most clearly delineated.

On the face of it, training by employers would seem to offer certain advantages. The training would almost certainly be relevant to the future work assignment of the trainee, because there would be no educational vested interests to dictate otherwise, and because employers would have no incentive to provide irrelevant training. The courses would probably be flexible, in the sense that their length would be determined by the time needed for a given group of trainees to learn a particular set of skills. The program would be flexible, in the sense that courses would be started up or dropped in close relation to the current skill requirements of the employer. These kinds of flexibility are possible to attain because the employer can shift his senior staff from production work to part-time training of new workers and back to full-time production with great ease. Under a system of on-the-job training, the trainee should be less drop-out prone in three respects: first, he will feel a closer nexus between success in learning new skills and immediate advancement in the firm than he would feel if he was a full-time student in a public training institution, where desire for success in learning is clouded by uncertainty about how and where he can finally get a job; second, because training is more individualized (which is possible, in turn, because the trainee spends part of his time in production), the pace of learning can be accelerated or slowed down in terms of the trainee's own progress, so that he is unlikely ever to become too bored or too discouraged with his instruction; third, he usually is paid.

However, there would appear to be certain disadvantages in shifting the main burden of training onto the shoulders of employers:

1. If standards of labor productivity are low to begin with, bright, young, eager trainees may regress to those prevailing low standards because they do not have any proper models of performance, if not of skill standards, to look up to.

2. Only in the largest firms—and sometimes not even in them—the exceptionally good craftsman or technician cannot find more than a handful of trainees to work with at any given point in time. He may have, perhaps, three apprentices when he could easily be teaching the more bookish parts of the craft to a group of twenty. On-the-job training does not commonly allow economies of scale in the use of the time of instructors. This is a critical shortcoming, given the scarcity of highly skilled persons in operational fields in this country.

So there are disadvantages both in relying mainly on publicly administered training institutions and in relying mainly on on-the-job training. Some countries have tried to solve this problem by combining the two systems: to have, for example, apprentices receiving instruction in the practical parts of their craft in the work place and simultaneously receiving instruction in the more analytical aspects of their trade in publicly administered training institutions (on a part-time basis). Actually, this solution may preserve the worst features of both plans. The public institutions may still be staffed by not-so-good instructors, on account of the low pay and status that working in such institutions implies. The trainee may tend to regress still to the low standards of productivity he sees about him in the work place. The problem of attaining efficient utilization of training skills, the producers' goods of the human resources industry, would still remain.

Fortunately, there is a "third way" to skill and technical training, namely, to have most of the training performed in institutions which are separate from the work place but to place those institutions under the financial and administrative control of consortia of employers. This plan was adopted in France in 1930, has worked well in Latin America (e.g., the Servicio Nacional de Aprendizaje—SENA of Colombia), and was taken up in England in 1964.[64] What are some of the possible advantages of the "third way?"

1. The system would provide flexibility in the education and training system where it is most needed. Contrast, for example, the planning of programs for medical with that of programs for skilled and technical workers (e.g., machinists, foundrymen, draftsmen, loom fixers, electricians, computer programmers, etc.). In the former case decisions are essentially judgmental: how many doctors per 10,000 of population shall the country have at fixed dates in the future? Once this decision is made, planning of programs for the training of doctors is relatively straightforward. In the latter case, one is dealing with many different types of skills, many of which are substitutable one for the other, or with respect to capital. Demand for specific skills is subject to short-term shifts, accordingly, in production functions. It is also subject to short-term shifts in output markets. Plainly, one should seek a flexible system of training for craftsmen and technical workers. Employer-administered training institutions can provide such flexibility, because employers can second their own craftsmen and technicians into teaching service on short-term assignments, if need be on a part-time basis.

2. At the same time, the training institutions would allow economies of scale to be achieved in the utilization of time of the trainers. The number of persons a given trainer was instructing could be determined more closely by considerations of pedagogical efficiency and less by accidental considerations of how many apprentices, say, a given plant in a given firm happened to have at the moment.

3. If the training institutions were financed by a payroll tax, then the institutions would have an elastic source of revenue and one under which the volume of funds flowing to training activities would be functionally related to the degree to which management was substituting labor for capital and higher grades of labor for lower. The stop-and-go characteristics of training when it is strictly a responsibility of individual employers would be ended (after all, private training programs are generally the first casualty of a downturn in profits in a firm).

4. The training institutions would have the financial resources and the access to data to deal with a number of important topics of applied research, such as the following: what are the strategic learnings from general education necessary to

learn specific work skills; how quickly can operational skills be taught to workers of different backgrounds and what are the cost-effectiveness relations involved in acceleration of training, selection of applicants for training, and the provision of remedial education; is a quantitative or analytical set of mind important in developing a high-productivity employee and, if so, how is this way of thinking best developed?

5. Other, somewhat more specific, advantages are the following: (1) Insofar as the training institutions required a permanent faculty, they should find themselves blessed with the financial resources and the prestige to attract competent teachers. (2) Students would benefit from having the intellectual discipline of the classroom but at the same time they would have been placed in a new, work-oriented setting, different from the public educational institutions in which many of them had previously suffered failure and lost commitment to learning. (3) The structure of the training system could easily recognize regional differences in skill requirements and in calibre of students. (4) Individual training institutions could incorporate different levels of instruction (remedial, standard, advanced) and different forms (full-time, sandwich, evening). (5) The program could accommodate high school students, high school leavers, and high school graduates, thus offering an incentive structure consonant with formal educational aspirations of different youth.

Nothing in the structural changes we have considered earlier would be compatible with this type of revision of work-related training.

It is plainly true that we can no longer see our existing educational structure as the only alternative. The various measures of change we have considered appear to have strengths, as nearly we can judge them *in vacuo*, but they may also have weaknesses. What is important is to have experimentation by our state governments with the different structural arrangements *and* with combinations of the various proposals. To ignore the discontent with the present system of education and to ignore the possibilities of fruitful change could be disastrous. However, it is hard to see which kind of system will work well in what various kinds of situations until the experiments are carried out.[65]

New degrees of flexibility could serve to make education more of a life-long process for a larger number of people. It may well be that in America we have exhausted the patience of the young with protracted years of continuing education without having exhausted the possibilities of education for human welfare and happiness. "Discontinuous" education might relieve the impatience, with years of schooling being interspersed (penalty free) with outdoor work, travel, community development, etc. The basic requirement is that education and training be available at times when people want it, under attractive conditions, and at costs that are equitable. It is not to be expected, nonetheless, that absolute reduction in expenditures can be achieved as a direct outcome of the adoption of the kinds of structural changes that have been discussed in this paper. More satisfaction in the public sector, yes, and possibly more social benefits—these would be the likely yields, not dollar savings in the short-run.

This idea of the general availability of educational services is the major American contribution to world educational thought; it stands in stark contrast to the efforts of most countries to regulate educational provision by the government's estimate of requirements for specific types of trained manpower. The structural changes we have discussed here all shift the locus of decision-making about consumption of educational services more directly into the household. For this reason they are in the American tradition.

FOOTNOTES

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1. In a developing nation like Pakistan, the pressures for structural changes arise from different kinds of problems: imbalance between numbers of students taking arts as against science courses, shortages of skilled craftsmen and technicians alongside unemployment of college graduates, brain drain, etc. Mostly, these matters are related to labor markets and reflect, in part, the fact that in Pakistan, as in most countries other than the United States, there is a fairly rigid relation between the type of education one receives and the status of occupation one enters—or seeks to enter.

2. Charles S. Benson and Peter B. Lund, *Neighborhood Distribution of Local Public Services* (Berkeley: Institute of Governmental Studies, University of California, 1969), pp. 98-100.

3. James S. Coleman, et al., Equality of Educational Opportunity (Washington: Government Printing Office, 1966); Charles S. Benson, et al., *State and Local Fiscal Relationships in Public Education in California* (Sacramento: State Senate, 1965).

4. "Inexorably," that is, in the absence of more expreme departures in instructional practices (computer-assisted instructions, classes of size and under, etc.) than our state-local school systems are likely to intro-

duce and in the absence of radical revisions in incentives placed before students to work hard in school.

5. See Statement by Frederick O'R. Hayes, Director of the Budget, City of New York on "National Priorities," United States Congress, Joint Committee on the Economic Report (February 24, 1970).

6. The cities in America have absorbed what is probably the largest migration of families from off the farms that the world has ever seen. Earlier, the cities had absorbed a great tide of the poor and spiritually dispossessed of Europe. The second migration, unlike the first, could not be accommodated without it being a contributing factor to a pervasive and lasting deterioration of quality of urban life. With hindsight, one can say that the federal government should have seen to it that the education of the rural poor over the course of the last several decades was of sufficient quality that the agricultural revolution—and the migrations it produced—would not cause such havoc as we see it did.

7. The author is indebted to Professor Martin T. Katzman for discussion on these points.

8. Not only do the rich withdraw their children from the public schools, but so do many middle-class Catholic families. The double "creaming off" has the effect of removing significant numbers of children from the public school environment who have academic ambitions and who are willing to accept academic discipline.

9. The failure rate in schools appears to be a function of city size. For some evidence, note the following estimates of school failure in New York State in 1968-69: New York City, 37 percent; other large cities, 27 percent; medium sized cities, 20 percent; small cities, 17 percent; villages and large central school districts (rural), 13 percent (State Education Department, University of the State of New York, *Education Statistics New York State* [Albany: The Department, 1970], p. 10.) Reasons for the relation are not clear, though it is reasonable to infer that city populations include disproportionate numbers of households who are sufferers from educational deprivation as a part of the southern legacy. See Irving Gershenberg, "The Negro and the Development of White Public Education in the South: Alabama, 1880-30," *The Journal of Negro Education* (Winter, 1970), pp. 50-59. On the other hand, it is possible to view the problem as one of class, not of race. See Alan B. Wilson, "Residential Segregation of Social Classes and Aspirations of High School Boys," *American Sociological Review* (December, 1959), pp. 836-45.

10. We refer here to "consumers" as households in which there are children of school-going age. In a broader sense, every household is a consumer of educational services, because the education industry is characterized by external economies of consumption, i.e., the industry provides "social benefits." In the present context, however, we are using the term "consumer" in its narrower meaning of a household obtaining schooling for its own children.

11. For a major decentralization proposal, we refer to Mayor's Advisory Panel on Decentralization of the New York City Schools, McGeorge Bundy, Chairman, *Reconnection for Learning: A Community School System for New York City* (New York: The Panel, 1967). The voucher proposal was first presented in recent times by Milton Friedman of the Department of Economics, University of Chicago. See his article, "The Role of Government in Education," in Robert A. Solo, ed., *Economics and the Public Interest* (New Brunswick: Rutgers University Press, 1955), pp. 123-42, reprinted in Charles S. Benson, *Perspectives on the Economics of Public Education* (Boston: Houghton Mifflin Company, 1963), pp. 132-42. Family-power-equalizing is developed in John E. Coons, William H. Clune, III, and Stephen D. Sugarman, *Private Wealth and Public Education* (Cambridge: Harvard University Press, 1970). The idea of obtaining educational services through contractual arrangements is presented in James S. Coleman, "Toward Open Schools," *The Public Interest* Fall, 1967 pp. 20-27.

12. Frederick O'R. Hayes. referring to material quoted from Otto Eck-

stein in "The Outlook for the Public Finances of State and Local Governments to 1975," in Office of the Mayor, City of New York, *Commission on Inflation and Economic Welfare of the City of New York* (New York: The Office, 1969).

13. And hence, the education industry finds it difficult to show any large amount of productivity gains. See Victor R. Fuchs, *The Service Economy* (New York: National Bureau of Economic Research, 1968), p. 76.

14. Charles S. Benson, *The Economics of Public Education*, (Boston: Houghton Mifflin Company, 1968), pp. 294-305.

15. Joseph M. Cronin, "School Finance in the Seventies: The Prospect for Reform," *Phi Delta Kappan* (November, 1969), p. 117. At the same time, we must recognize that education in the United States is handsomely supported as compared with levels of expenditures in other countries. For example, in the mid-sixties, the United States educational system (all levels) was consuming resources equal in value to four times the Gross National Product of Pakistan, and Pakistan is one of the largest countries in the world in terms of population. In other words, 130 million Pakistanis would have to work for four years to feed the United States' educational system for one year (at the level of school and university expenditures in the mid-sixties).

16. *New York Times*, March 4, 1970, p. 1.

17. Coons, et al. pp. 256-68. See also John E. Coons, William H. Clune, III, and Stephen D. Sugarman, "Educational Opportunity: A Workable Constitutional Test for State Financial Structures." *California Law Review* (April, 1969), pp. 321-22.

18. The general taxpayer, however, would still be required to pay his customary share of state and federal contributions for education, including partial subsidy of tuition for children in above-average schools.

19. Friedman.

20. Arthur E. Wise, "The Constitutional Challenge to Inequities in School Finance, *Phi Delta Kappan* (November, 1969), pp. 145-48; James W. Guthrie, George B. Kleindorfer, Henry M. Levin, and Robert T. Stout, *Schools and Inequality* (Washington, D. C.: The Urban Coalition, 1969), pp. 2-3.

21. This phenomenon can readily be observed in New England. Even in California, it can be seen to exist. See Charles S. Benson, *et al., State and Local Fiscal Relationships in Public Education in California*, Chapter IV, Tables 2 and 4, pp. 45, 48.

22. State Committee on Public Education, *Citizens for the 21st Century* (Sacramento: State Board of Education 1969), p. 63.

23. See Guthrie, et al., Ch. 3, 4, and 5.

24. Coons, et al., p. 388.

25. Frank I. Michelman, "The Supreme Court, 1968 Term Foreword: On Protecting the Poor Through the Fourteenth Amendment," *Harvard Law Review* (November, 1969), pp. 56-59.

26. Mayor's Advisory Panel on Decentralization of the New York City Schools, See also Henry M. Levin, ed., *Community Control of Schools* (Washington, D.C.: The Brookings Institution, 1970).

27. Coons, et al., Private Wealth and Public Education, pp. 268-69.

28. Mayor's Advisory Panel on Decentralization of the New York City Schools, p. 4.

29. *Ibid.*

30. *Ibid.*, p. 10.

31. *Ibid.*

32. It is necessary, of course, to develop financial relationships between the Central Board of Education and the Community School Districts and between both and the state government. These were discussed in Part IV of the Bundy Report. Several alternative patterns were suggested, but no final recommendation was made.

33. *Ibid.*, p. 73. However, the general tenor of the Bundy Report appears to be negative toward open enrollments.

34. Friedman.

35. Ibid., p. 135.

36. *Ibid.*, p. 137.

37. A.C.F. Beales, "Historical Aspects of the Debate on Education," in Institute of Economic Affairs, *Education: A Framework for Choice* (London: The Institute, 1967), p. 8. More recently, a voucher plan in England has been proposed by Professor Alan Peacock and Jack Wiseman. *Education for Democrats* (London, Institute of Economics, 1964).

38. A.C.F. Beales, p. 20.

39. Grievance procedures are coming to be of increasing importance in education. They need not be confined to resolution of problems between administrators and staff; they could also be used to resolve issues between school staffs and parents.

40. M. V. Pauly, "Mixed Public and Private Financing of Education: Efficiency and Feasibility," *American Economic Review* (March, 1967), pp. 120-30.

41. *Ibid.*, p. 129.

42. John E. Coons, "Recreating the Family's Role in Education," *Inequality in Education* (Harvard Center for Law and Education, Numbers 3 and 4, 1970), pp. 1-5.

43. Each institution would receive from government a given amount of fee per student. The amount of fee would vary by category of institution but not by category of student. Poor families would pay much less in school charges than the amounts of the fees paid to the institutions; rich might pay more; but overall the government would pay out more to the schools than it collected in charges—hence, the public subsidy.

44. It is barely conceivable that the community which met the family's taste with respect to one local public service would also meet its tastes with respect to the remainder of local public services. Apparently, the idea is that the family would choose its residence on the basis of which community met its standards on what were seen by it to be the most important services. Obviously, this is not an ideal solution, especially when there are strong differences in taste *within* a given household.

45. To some extent, the addition to the local community's taxable potential would be offset by a reduction in its receipts of state aid for education, but state aid programs are by no means so finely tuned that the locality would be left indifferent between having or not having the power plant, if the choice is seen strictly in terms of local government finance.

46. They still could make use of unaided private schools, however.

47. Coons, et al., "Educational Opportunity: A Workable Constitutional Test for State Financial Structures," p. 311.

48. In the volume, *Private Wealth and Public Education*, pp. 282-83, Coons et al. suggest that district power equalizing might be applied to all local public services. This would be a comprehensive approach to the problem of municipal overburden.

49. Michelman, p. 51.

50. There remains a question whether the ability to judge true worth, as distinct from the more superficial aspects of style, is randomly distributed in the population.

51. John E. Coons, "The Draft Statute with Comments" (Berkeley: School of Law, University of Califarnia, 1969), mimeo., pp. 1-38.

52. It is a part of the Coons' plan that sufficient places in schools at each expenditure level would be available in all localities.

53. One way around the difficulty, though possibly not a good way, is to make the lowest-priced schools free to all income classes.

54. Coons, "Recreating the Family's Role in Education," p. 16.

55. However, the tuition rates *could* be raised over a period of time, adjusting them year-by-year, starting with the earliest year of enrollment.

56. Coleman.

57. The basic ideas are not new. "Payment-by-results" was the standard of remuneration for state school teachers in mid-nineteenth century England. It is traditional in India and Pakistan that interested (and well-

heeled) parents pay the teacher (who is ostensibly fully employed in a state or private school) an extra fee to come to their homes and give private tuition to their children in off hours. See Nirad C. Chaudhuri, *The Autobiography of an Unknown Indian* (Berkeley: University of California Press, 1968). pp. 150-51. Similarly, in the early nineteen-sixties, the then U.S. Ambassador to India, John Kenneth Galbraith, proposed that teachers in Calcutta be paid ". . . a subsidy in the form of salary to every teacher that sets up in business at any possible place and passes a given number of pupils through carefully conducted examinations each year." *Ambassador's Journal* (Boston: Houghton Mifflin Company, 1969), p. 306.

58. Coleman, p. 25.

59. "Private Firm Wins Performance Contract: If Students Don't Learn, District Doesn't Pay," *Phi Delta Kappan* (November, 1969), p. 135.

60. Coleman, p. 27.

61. The idea is that offering a higher percentage in contract fees at this low level of purchase of educational service might produce too many cases of students failing to receive a minimum amount of schooling in basic subjects. The provision suggested here, it should be noted, destroys Coons' idea that there should be only four levels of prices for school services (or some such small number). Allowing parents to take part of their entitlement in contracts would mean that schools would have to produce a much more diversified price structure.

62. In reading an earlier draft, Professor Coons suggested that it is possible to preserve the features of FPE while providing contract vouchers to a greater degree than indicated here. One approach would be to keep the four school expenditure levels (only) and let families choose a higher tax rate than specified for a given school, taking the excess tuition in contract vouchers. Another would be to provide contract vouchers to families that were willing to pay a small additional (supplementary) tax.

63. Friedman, pp. 139-42. A similar but much more thoroughly developed proposal was made by William Vickery, "A Proposal for Student Loans," in Selma Mushkin, ed., *Economics of Higher Education*, (Washington, Government Printing Office, 1962), p. 270 ff.

64. For a discussion of the corresponding program in Brazil (SENAI), see Nathaniel H. Leff, *The Brazilian Capital Goods Industry, 1929-1964* (Cambridge: Harvard University Press, 1968), pp. 74-81.

65. Indeed, it was recently announced that the Office of Economic Opportunity is sponsoring a pilot program in education vouchers in selected school districts in the fall of 1971. *International Herald Tribune* (June 5, 1970), p. 3.

CHAPTER 6

The Effect of Different Levels of Expenditure on Educational Output

HENRY M. LEVIN

To the man on the street and to many educators alike, the quality of education in a school district is closely related to that district's expenditures. Historically, "quality education" and additional financial support for the schools have been tied together inextricably by those who wished to improve the schools. Over the past four decades, professional educators and their organizations have exhorted legislators and taxpayers alike that better schools mean more dollars, and clearly the guardians of the public purse strings believed the message. Annual per pupil expenditures for elementary and secondary schools increased seven-fold from $108 in 1930 to $750 in 1968.[1]

Even when these figures are adjusted for the declining purchasing power of the dollar during that period, per pupil expenditures showed an increase of 350 percent. That is, in dollars valued at 1967-68 prices, the average expenditure per student in public elementary and secondary schools rose from about $215 in 1930 to approximately $750 in 1968.

During the decade of the sixties, two important changes in this scenario took place which raised doubts about a simple and straightforward relationship between educational expenditures and quality. Suddenly the public had been made aware that the schools were failing to teach basic skills to large numbers of youngsters from low income backgrounds.[2] Following the usual Pavlovian pattern of response to criticism, educational agencies and organizations asserted that any failures of the schools—if there were failures at all—were due to inadequate finances. They suggested that more educational dollars spent on students from low income backgrounds would remedy the problem. And, indeed, more dollars for so-called disadvantaged students were squeezed from federal, state, and local treasuries. The Elementary and Secondary Education Act of 1965 itself provided over $1 billion a year to support educational and related services for students from low income families. Almost every major city set up its own compensatory education program, and states also provided additional funds for these purposes.

Surprisingly, the evidence gathered from compensatory education programs suggested that additional dollars rarely produced any measurable improvement in educational outcomes for most disadvantaged students. That is, the mere fact that more dollars were spent on particular children in no way assured that those children would be better off educationally. For example, the U.S. Office of Education in evaluating the effect of monies allocated under Title I of the Elementary and Secondary Education Act of 1965 found that on the basis of reading scores, ". . . a child who participated in a Title I project had only a 19% chance of a significant achievement gain, a 13% chance of a significant achievement loss, and a 68% chance of no change at all (relative to the national norms)."[3] Further, the projects included in the investigation were ". . . most likely to be representative of projects in which there was a higher than average investment in resources. Therefore, more significant achievement gains should be found here than in a more representative sample of Title I projects."[4]

Other evaluations of compensatory education showed consistent evidence that additional dollars in the school coffers did not improve ostensibly the quality of education received by disadvantaged children. Of some 1,000 programs reviewed for the U. S. Office of Education, only 21 seemed to have produced significant pupil achievement gains in language or numerical skills.[5]

Moreover, cost-benefit analyses of such programs suggested that spending on conventional compensatory education approaches represented a poor social investment for the reduction of poverty.[6]

The theory that additional educational expenditures automatically led to better schools was also challenged directly by the findings of the Coleman Report.[7] Coleman directed a national survey of schools and their relation to student achievement. On the basis of extensive analysis of pupil, teacher, and other school data, Coleman concluded that per pupil expenditures, books in the library, and a number of other school measures show very little relation to student achievement if the social background of individual students and their classmates are held constant.[8]

While the statistical techniques and data of the report led clearly to an understatement of school effects, the pessimistic finding on school effects dealt a severe blow to the widely held view that higher expenditures would improve educational outcomes.[9] Moreover, the extensive circulation of the Coleman Report and its loose interpretation by many commentators and reviewers gave wide currency to the claim that increases in school expenditures would produce *no* gains in student achievement. Both the compensatory education experience and the Coleman Report raised serious challenges to the theory that money, itself, represented a good general remedy for curing the infirmities of the schools.

HOW DO EXPENDITURES AFFECT EDUCATIONAL OUTCOMES ?

The purpose of this paper is to explore the relationship between educational expenditures and educational effectiveness. In order to trace out this linkage we will first use economic analysis to develop the conceptual ties between expenditures and educational outcomes. Second, we will review empirical studies of resources effectiveness in education. Finally, we will present some policy recommendations for improving the efficiency of educational expenditures.

In order to understand how expenditures are translated into educational outcomes it is necessary to define several concepts from economics as they relate to the production of education. For these purposes the school or school district can be considered to be a firm that is expected to maximize educational output within the limits of a fixed budget.[10] That is, faced with a given budgetary constraint on expenditures, the school district is expected to obtain the largest possible educational outcome. In order to observe the conditions under which this would be accomplished, it is necessary to consider an educational production function.

Educational Production Functions

An educational production function can be depicted as a technological relationship showing the maximum amount of educational output that could be produced by each and every set of specified inputs or factors of production.[11] Equation (1) represents a production function for an educational enterprise where A signifies a measure of educational outcomes, B denotes the nature of the student clientele, and $X_1, X_2, \ldots, X_n$ represents a set of inputs or resources used by the schools to produce education. For the moment,

$$(1)\ A = f\ (B, X_1, X_2, \ldots, X_n),$$

let us assume that A is a composite measure of educational outcomes that we expect from the schools such as increases in learning, changes in attitudes, social consciousness, and so on.[12] Ideally, A should represent the "value-added" to the student body and to the larger society in a given period that is attributable to the school production process over that period. That is, changes in attitudes, performance, cultural appreciation, and so on are the outputs that schools produce. A "value-added" measure tacitly accounts for the fact that some children begin the schooling process with different levels of performance, and the schools should only be held accountable for that part of the change in such measures that is attributable to the schooling influence. Attempts at using the value-added approach have fallen short of success, however, primarily because of measurement problems.[13]

B represents the various characteristics of the students that affect educational outcomes. These include racial and cultural factors as well as ones that reflect the socioeconomic background of the student and his community. The educational outcomes A are affected by student characteristics B for two reasons. First, the objectives that we have for the schools are often based upon the values of the dominant group in society and reflect the cultural attributes of that group. Thus, tests of verbal aptitudes are culture-specific reflecting the vocabulary and syntax of middle class whites rather than lower class whites, blacks, or other minority groups. Second, middle class families tend to emphasize learning in the home to a greater extent than those of lower socioeconomic strata. This advantage is reinforced by the greater ability of middle class families to give their children a wider range of experiences and learning materials, and by the tendency of more highly educated parents to impart substantial vocabularies to their children and to teach their children certain skills which can be transferred to the school experience.[14]

The variables $X_1, X_2, \ldots, X_n$ represent the inputs provided by the educational firm for affecting changes in *A*, educational outcomes. These include all types of personnel, materials, facilities, and buildings that are used to produce education. The Xs may signify not only the quantities of such inputs but also their qualitative characteristics. Thus, X_1 may be a variable denoting the number of teachers, X_2 may represent teacher verbal ability, X_3 may signify teacher experience, and so on.

The assumption is made that an increase in *B* or in any school input X will increase school output *A*. Yet, it is also assumed that *A* will not increase indefinitely at the same rate as increases in *B* or one of the other school inputs. Rather, the law of diminishing marginal returns should apply, meaning that at some point the addition to *A* attributable to each additional unit of *B* or *X* will begin to diminish. In essence this suggests to the educational decision-maker that the gains in output from increases in an input such as teacher experience, teacher degree level, library size, and so on will be smaller the larger the intensity of those inputs. When a school library has 1,000 volumes, an additional 1,000 volumes may have a substantial impact on the language skills of the students. On the other hand, if the library already contains 10,000 volumes, an additional 1000 volumes may show only a nominal effect.

The production function for education is the means by which school resources are transformed into educational outcomes. Yet we have not established the link between outcomes and school expenditures since the inputs entering the production function are physical and psychological ones rather than dollars. But dollars are used to purchase those physical and psychological inputs. Accordingly, (2) shows the relationship between the dollar budget accorded educational decision makers and the transformation of that budget into school inputs.

$$(2)\ R = P_1X_1 + P_2X_2 + \ldots + P_nX_n$$

R represents the total dollar expenditure or budget allocated to the educational firm; P_1 signifies the price per unit of input X_1; P_2 is the price per unit of input X_2; and so on. The budget equation can be interpreted to mean that the entire dollar allocation R will be devoted to expenditures on the inputs (X_1, X_2,

. . ., X_n) where the expenditure on each input is defined by the amount of each input used multiplied by its price. If X_1 is years of teacher experience and the cost for obtaining teacher experience is $100 per additional year per teacher, the $100 multiplied by the number of years of experience (X_1) will be that part of the total budget *R* that will be devoted to teacher experience. The sum of all of the inputs multiplied by their prices can not exceed the total budgetary allocation *R*.

The production function for education (1) and the budget relationship (2) are the two relations that the educational firm operates on to tie educational expenditures to educational outcomes *A*. In order to obtain the greatest increase in *A*, for any given budget *R*, the decision maker must determine that combination of the various inputs *X* that will maximize output within the expenditure constraint. At that point dollar expenditures will be allocated most effectively. In general, this condition is satisfied by purchasing and utilizing each of the inputs X_1, X_2, . . ., X_n in such a combination that the additional contribution to output from the last dollar expended on each input yields the same effect on output. That is, if an additional dollar spent on X_1, yields a greater contribution to output than one spent on X_2, then more X_1 should be applied to producing education and less X_2 should be used. The law of diminishing marginal returns suggests that an increase in the use of X_1 will be accompanied by a decline in the rate of increase in *A* due to more X_1, so at some point the marginal or additional impact of X_1 on *A* relative to that of X_2 on *A* will be equal for the last dollar spent on each.

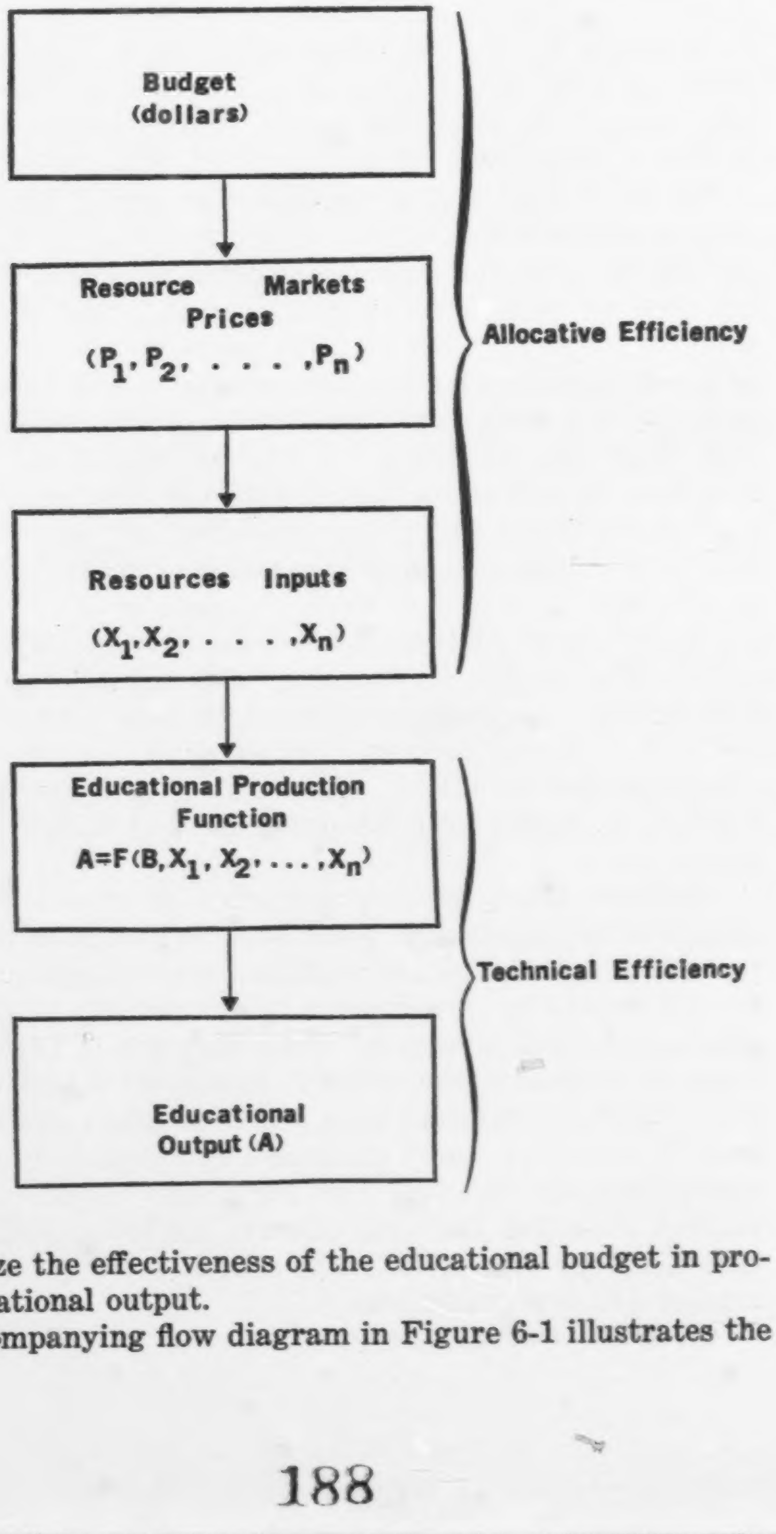
Stated in more specific terms we would expect to obtain the largest impact on educational output *A* by satisfying the conditions described in (3).

$$(3)\quad \frac{\textit{Additional output from } X_1}{P_1} = \frac{\textit{Additional output from } X_2}{P_2} = \cdots = \frac{\textit{Additional output from } X_n}{P_n}$$

The additional output from each input relative to its price should be equal for all inputs. If any particular input yields a higher increment to *A* relative to its price, then more of that input should be applied so that the law of diminishing returns will equalize the additional output/price ratios.[15] This solution

Fig. 6-1

Flow Diagram of Educational Resource Transformation


Budget
(dollars)
Resource Markets
Prices
$(P_1, P_2, \ldots, P_n)$
Resources Inputs
$(X_1, X_2, \ldots, X_n)$
Allocative Efficiency
Educational Production
Function
$A=F(B, X_1, X_2, \ldots, X_n)$
Educational
Output (A)
Technical Efficiency

will maximize the effectiveness of the educational budget in producing educational output.

The accompanying flow diagram in Figure 6-1 illustrates the transformation from dollars to educational outcomes. Dollar budgets are used to purchase school inputs in resource markets. Such markets include those for various types of personnel, equipment, physical space, and so on. These resources inputs are combined by educational managers into the educational production function, thereby producing the educational outcomes represented by *A*. The first three stages refer to allocative efficiency and the last two refer to technical efficiency. These concepts will be explained below. If all educational firms used dollars in their most efficient ways, then conditions (3) set out above would hold and *A* would be maximized for any specified level of expenditures, *R*.

Yet, in order for educational firms or schools to satisfy the criterion of efficiency, we would expect that several factors would be present. Each of these underlies the analogous model of profit maximization for business firms. (1) Substantial management discretion exists over which inputs are purchased and how they are organized to produce education; (2) reliable measures of output for the educational firm are available on a systematic basis; and (3) some system of incentives exists to spur educational managers to maximize output *A*, for any budget level *R*.

In fact, none of these factors are present. School principals and superintendents are bound by state education codes, regional accreditation requirements, contracts with educational personnel, and an inbred reverence for existing practices. Under such conditions and traditions, school managers show very little discretionary control over the purchase and utilization of school inputs.

Further, there are few outcomes of the schools that are measured systematically. While some achievement data from paper and pencil testing are available, even these are not adjusted for differences in performance due to student backgrounds and other non-school influences. Thus, they are of little operational value in assessing the schools' effects on achievement. Moreover, such tests measure such a limited range of outcomes, that even if they were useful on their own terms, they would not be appropriate as exclusive foci for school policy. Indicators of student attitudes, feelings, cultural aptitudes, and other skills that might be developed by the schools are not obtained in any regular and systematic way.

Even the accounting systems used by the schools are unable to link the ingredients of particular programs or the programs themselves to either costs or outcomes. Traditional line-item budgets yield only the information that money was spent on particular items serving functions such as administration, instruction, and so on, and even these so-called functions are misnomered.[16] While the trend is clearly toward accounting systems that do tie resources, costs, programs, and outcomes together for the educational sector, so called planning-programming-budgeting systems (PPBS) are at a very early stage in their application to the schools.[17] In summary, there do not exist school information systems that provide useful data to school managers for educational decision-making.[18]

Finally, incentives for maximizing educational outcomes for a given budget do not seem to be important characteristics of schools as organizations. Financial rewards and promotions for school personnel are handed out in a mindless fashion according to the years of service and accumulation of college credits.[20] Individual schools, teachers, or administrators who are successful in achieving important educational goals are treated similarly to those who are unsuccessful, mediocre, or downright incompetent. In lockstep fashion the schools reward all equally. It is no wonder, then, that schools can fail persistently to teach children to read, or to foster the formation of healthy attitudes, for there are no direct incentives to change the situation. That is, success is not compensated, or formally recognized, and the reward structure is systematically divorced from educational effectiveness.[21] In contrast, commercial enterprises tend to compensate their personnel on the basis of their contributions to the effectiveness of the organization. Commissions for sales personnel, bonuses, promotions, profits, and salary increases all represent rewards for individual or organizational proficiencies.

TECHNICAL AND ALLOCATIVE EFFICIENCY

Given the facts that educational managers lack the discretionary control, the information, and the incentives to maximize educational output for any dollar constraint, it is reasonable to expect massive inefficiencies in the operations of schools. That is, dollar expenditures applied to the schools could probably be used far more effectively than they presently are. Of course, it is important to point out that there are likely to be large differences from school to school, some schools being more efficient than others. Differences in efficiency among schools will depend upon differences in managerial skills as well as differences in the three characteristics outlined above, discretionary control, information, and incentives.

For purposes of analysis it is useful to divide inefficiencies into two types, *technical* and *allocative*. Technical inefficiencies refer to those attributable to using the physical resources of the school in such a way that less educational output is achieved than might be done under some alternative utilization. Allocative inefficiencies refer to those attributable to using the dollar budget of the school in such a way that less output is achieved than could be attained if a different combination of physical resources were purchased even when technical efficiency is satisfied.

More specifically, with any set of physical resources that the schools purchase—the various types of administrators, teachers, other personnel, materials, and facilities — there is some way of organizing them that will maximize the educational output of the school. For example, there is abundant evidence of so-called aptitude-treatment interaction such that some resources are effective for one type of child and relatively ineffective for another type.[22] Some children thrive on structured classroom situations, while others develop more fully in a freer atmosphere. Yet students are not assigned to teachers on the basis of these characteristics. Rather the assignment practices seem to derive from bookkeeping traditions more than from educational rationale.

Most of the technical inefficiencies of the schools reflect the mindlessness of the educational decision-making, and no practice illustrates this better than that relating to class size. The goal of most elementary schools seems to be that of making class size uniform at each grade level if not throughout the enterprise. But the relevance of class size to the learning situation must surely depend on the nature of the students, the subject, the teacher's behavioral style, as well as many other factors. In some situations very small groups are needed in order to individualize instruction, while in other contexts 40-60 students would be more appropriate. These concepts are not recognized by the bland uniformity of current class-size practice.

Often, innovational equipment and curricula are not properly integrated into the school organization, leading to other technical inefficiencies. Typically, the innovations are chosen by administrators rather than the teachers who must implement them; teachers are given inadequate training and lack appropriate commitment; and meaningful evaluation of the innovation does not follow its adoption. Accordingly, the new curriculum or innovational equipment is rarely utilized in a technically efficient way.

Given the resources that schools purchase, greater educational effectiveness could be obtained if they were organized differently, that is, if they were technically efficient. Technical efficiency, then refers to the linkage between the last two blocks in the flow diagram in Figure 6-1, the tie between the educational production function *and* output. Yet, even if the schools were technically efficient (maximizing output for a set of physical inputs) it does not follow that the school is allocatively efficient. Allocative efficiency occurs when the dollar budget is spent in such a way that the resources that are purchased yield the best outcome that can be attained for the given budget. That is, any other combination of resources that could be purchased with that budget would obtain a lower level of output.

Schools are generally allocatively efficient when equation (3), above, holds. That is, more of each resource would be purchased until the additional output from another unit of the resource relative to its price is equal to the additional output from any other resource relative to its price. Both the relative prices and the accretions to output must be considered in obtaining allocative efficiency. Yet, the schools do not have knowledge of either the additional outputs or prices of hiring additional inputs. Thus allocative decisions are made on the basis of conventional wisdoms, and even massive increases in budgets are allocated to such costly resources as more personnel for reducing class size while alternative ways of improving the schools are either not considered or are rejected out-of-hand without considering whether they yield greater increases in output for the additional expenditures.

The quest for allocative efficiency is represented by the linkages among the first three boxes in Figure 6-1 where the budget is applied in the market place to obtain resource inputs. One tool for seeking allocative efficiency is that of cost-effectiveness analysis. Yet, cost-effectiveness analysis has been used very rarely in making educational decisions, in part, because educators are generally unfamiliar with its underlying concepts and complexities. But certainly the limited data base with which educators must work represents a severe limitation to its present application.[23]

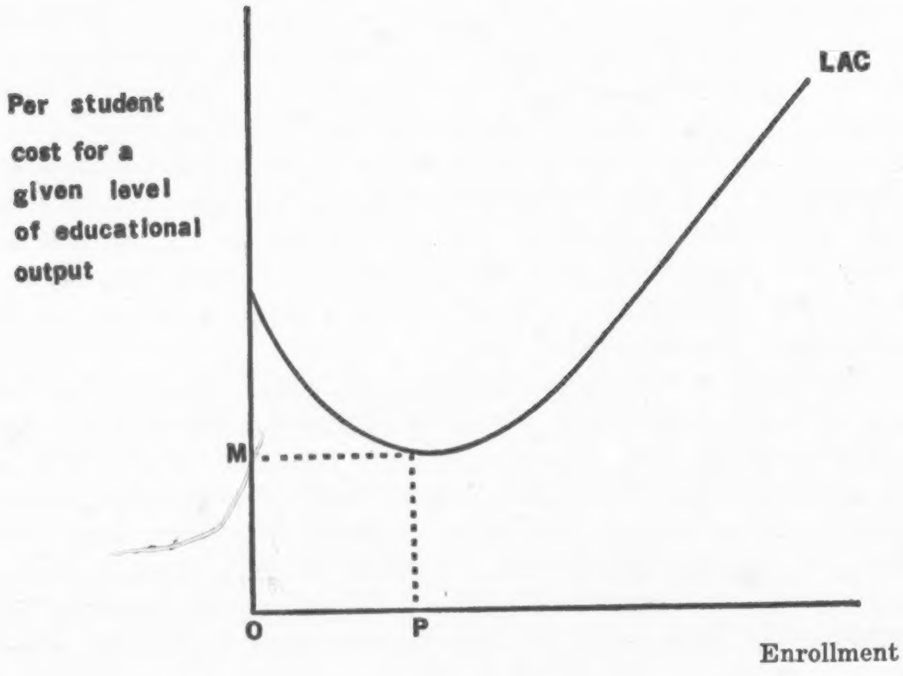
Size and Efficiency

Technical and allocative efficiencies are not the only determinants of educational effectiveness for a given level of expenditure. The size, or enrollment, of a school or school district is also a crucial factor. That is, the size or scale of the school enterprise can affect the economic efficiency with which it produces educational services even if the school is allocatively and technically efficient. Translated into costs, the same level of educational output will incur differences in costs depending upon the enrollment of the school or school district.

In general we would expect a U-shaped cost curve as in Figure 6-2.

Fig. 6-2

Average Cost as a Function of Enrollment



The long run average cost curve LAC shows declining costs per student as enrollments increase up to enrollment level P. This phenomenon reflects the fact that minimum teacher and other resources required for any level of educational outcome will not be fully utilized at very low enrollments. That is, these resources represent minimum "fixed capital" requirements that are necessary just to provide an educational offering of a given quality. Thus, at very low levels of enrollment the cost per student is very high. It is this phenomenon which fed the school consolidation movement during the first half of this century.

Beyond enrollment level P, costs rise as the size of schools or school districts increase. The reason for increased costs as a function of enrollment is that the existing organization and technology of schools can not be administered efficiently at very high enrollment levels. The difficulties of governing and administering such large units means that higher resource inputs per student are required to achieve a given outcome.[24] That is, diseconomies of scale set in as enrollments move beyond P.

Thus, a third type of efficiency that will be reflected in the effectiveness of educational dollars is that of size or scale of enterprise. At enrollment level P, the unit cost for a given educational outcome is minimized. As schools diverge from this optimal size they will face increasing costs without increases in the educational output for each student. Accordingly, for an educational firm to maximize educational product for a given budget it must satisfy not only the criteria of technical and allocative efficiency, but also those of scale. That is, it must be the appropriate size to operate at P. In the next section we will review briefly the empirical findings on education efficiency.

EMPIRICAL FINDINGS ON EDUCATIONAL EFFICIENCY

Three types of studies exist which seek to determine the relationships between school inputs and educational outcomes. The first type of study attempts to link total educational expenditures to output measures. The second group includes those that have attempted to estimate the effects of various functional components of expenditure on school outcomes, and the third set of studies represents estimates of the relationships between resources as measured in physical terms and school outputs (educational production functions). Sometimes the latter two approaches have been combined so that resources are measured in dollars for some inputs and in physical qualities and quantities for others.

Expenditure Studies

Expenditure studies seek to examine the gross relations between dollar inputs and educational processes and outcomes. While several of these inquiries have been carried out in recent years, this approach has been pursued, broadly speaking, for at least three decades.[25] Such studies shed little light on the economic efficiency of schools for a variety of reasons.

First expenditures are an aggregate dollar amount that is not decomposed into the actual educational resources that are being used. Thus, we do not know from these studies why expenditures affect outcomes in the samples or which particular composition of expenditures is most productive (the question of allocative efficiency). Second, the measures of expenditure are generally crude ones that are not adjusted for price level differences. Such adjustments are crucial when one is considering national, regional, and statewide samples of schools. Even in metropolitan areas the cost of equivalent teachers, construction, and land is generally higher in the cities than in the suburbs.[26] Moreover, inconsistencies among school districts and states in accounting procedures as well as imprecise survey questions on expenditures have likely led to important measurement errors in several studies.[27]

Early studies tracing the link between expenditure levels and school performance were carried out by specialists in school administration. These so-called cost-quality studies were carried out in order to see how dollar support levels were associated with school quality.[28] In addition to the measurement problems outlined above, these studies suffer from two other severe deficiencies. First, a lack of data on educational outcomes necessitated the use of such indirect measures of school quality as perceived innovation and change or other subjective ratings. Second, these works ignored completely the social class aspects of the school in explaining "school quality." Thus, while the cost-quality studies are provocative when placed in historical perspective, they can not provide an empirical basis for improving our understanding of the effect of educational expenditures on school outcomes.

In contrast, several recent studies have examined the relationships between school expenditures and student achievement scores while attempting to control for differences in socioeconomic backgrounds of students. Thomas Ribich addressed himself specifically to the effects that higher school expenditures might have on the educational attainment of disadvantaged children.[29] Adjustment for student backgrounds, B in equation (1), was attempted by carrying out the analysis only for students from the lowest socioeconomic origins.

Using the Project Talent data, Ribich examined achievement levels of some 6,300 twelfth grade males who were ranked in the bottom 20 percent of a nationally representative sample on a socioeconomic index. He concluded:

> ". . . it seems clear that low status boys in higher expenditure schools do accumulate more knowledge than their counterparts in low expenditure schools. The effect of increased school expenditures on test performance is shown to be the strongest at the lower end of the expenditure range. A difference of more than a full year of achievement appears between boys in school districts spending less than $200 and districts spending between $200 and $300. The apparent power of increased expenditures to improve performance diminishes progressively with each successive expenditure level.[30]

Much of this increase was due simply to higher costs for a constant level of school services. Thus Ribich observed a tendency for lower-status students to have greater achievement scores the higher the level of school district expenditures, but the relationship was a declining one as expenditures rose.

Kiesling also explored the tie between school district expenditures and student achievement; but his analysis covered the full range of social class backgrounds and several grade levels.[31] More specifically, Kiesling estimated the expenditure-performance relationship for school districts at various grade levels between grades 4 and 11 and by the occupational status of the father. In addition he carried out separate analyses by size and type of school district. Using such explanatory variables as school expenditures, measured IQ of the students, and school district size, Kiesling found a varying association of expenditures on achievement from sample to sample.[32]

What is particularly interesting is his finding that for low socioeconomic status children the relationship between school expenditures and achievement was negative. Kiesling concluded "It seems that high expenditure (per pupil) districts do a poorer job of educating their low background students than low expenditure districts do."[33] This finding supports the possibility that spending money on those school resources that improve the performance of middle-class children may have a deleterious impact on the performance of lower-class students by undermining the cultural attributes of the latter.[34]

Just as Ribich found that additional expenditures seemed to have a greater impact on pupil achievement at low expenditure levels than at high ones, so did Kiesling. For large urban districts an additional $100 of expenditure per pupil was associated with an additional pupil gain of 2.6 months in standardized test units at the low end of the expenditure range but only 1.4 months at the upper end of the range.[35] In summary, Kiesling found that the apparent effect of additional expenditures on achievement varied according to the initial expenditure level, the type and size of the school district, and the socioeconomic class of the student sample.

Expenditure-Component Studies

The studies examining the relation between total per student expenditures and school outcomes can throw little light on how to improve the technical and allocative efficiency of schools, since they can reveal—at best—only the "state of the art" linkages under the existing inefficient organization of resources. That is, in no way can such inquiries tell us which specific inputs are making a difference and whether that difference could not be achieved by some cheaper input combination. The expenditure component studies disaggregate total expenditures into constituent parts in order to see if expenditures on particular types of inputs have an impact on educational outcomes as well as to explore the relative dollar payoffs. Since these studies do not address themselves to how the resources are used they can not reveal insights into technical efficiency. Rather, they are addressed to yielding information on which group of resources that the school purchases gives the highest educational returns per dollar input, a matter of allocative efficiency. Many of the problems in measuring expenditures that were outlined in the previous section are also reflected in the expenditure-component studies.

A fairly large number of recent studies that make the necessary attempt to account for the influence of student socioeconomic class on school outputs have used an expenditure-component approach.[36] These explorations measure some inputs in physical terms and other ones in dollar values. Perhaps the most interesting aspect of these studies is the rather consistent finding that teacher salary levels show a positive and significant association with student achievement when other measurable influences are held constant.[37]

Presumably, at higher teacher salary levels the quality of teachers recruited by school districts improves. That is, the higher the salary the larger the pool of candidates for teaching positions. At lower teaching salaries many of these candidates would prefer to seek more lucrative teaching employment. Out of this larger applicant pool the schools can obtain a more competent teaching force.[38] Indeed, the empirical evidence on the tie between teacher quality and salaries also supports this interpretation.[39]

Estimates of Educational Production Functions

The most prevalent recent work on educational production relates school resources measured in physical and psychological terms to school outcomes. These studies represent attempts to estimate variants of equation (1) described in the introductory section of this paper, and they can be thought of as the closest approximations to educational production functions that are currently available.

Most of these studies apply multivariate statistical models to large-scale surveys of schools and students.[40] Consistent with the findings of the expenditure-component studies, the characteristics of teachers seem to be the most important determinant of school outputs as reflected in pupil achievement scores.

The landmark study by Coleman and his associates showed that other than possible student influences on each other, the attributes of the teachers appeared to be the most important in school determinant of scholastic achievement.[41] The fact that these effects were probably understated by the statistical model used by Coleman to analyze the data reinforces the apparent prominence of teacher characteristics in influencing educational outcomes.[42] Since schools focus on teacher-student interactions and teacher inputs account for the preponderant share of school budgets, this finding is not surprising. Yet, the particular attributes of teachers which have been shown to be statistically related to student achievement do raise questions about conventional concepts of teacher quality.

Perhaps the most intriguing finding is the observed association between teacher verbal abilities and student achievement. The survey on which the Coleman Report was based included a short vocabulary test that was appended to the teacher questionnaire. Both in the Coleman study and in re-analyses of the Coleman data, the teacher's verbal score was found to be related rather consistently to pupil achievement at the several grade levels and for samples of both black and white students.[43] In a later study that relied upon a different sample and data base, Hanushek also found the teacher's verbal score to relate to pupil performance.[44] Of course it is important to point out that the teacher's verbal score may be a proxy for a large number of possible cognitive and personal traits of the teacher; so that the observed relationship between the teacher's verbal pattern and student achievement may derive from these associated traits rather than the teacher's verbal proficiencies *per se*.

While teacher experience has also been found to be related to student achievement on a fairly consistent basis, the teacher's degree level has rarely shown such an effect.[45] Moreover, variables reflecting the teacher's certification status on the basis of existing state requirements seem to show no apparent association with student achievement. Finally, most studies have found no statistical effect of differences in class size on pupil performance.

While these findings seem reasonable, they should be interpreted within the present context of the research that produced them. The educational models underlying these studies are not yet so refined, nor are the techniques of measurement so perfect, that we can consider the results as final ones. There is a great deal of knowledge that must be accumulated before we can be more nearly certain of our present insights into the production process. Moreover, since it is reasonable to believe that schools are operating inefficiently, even these insights must be viewed as ones derived from schools that are not technically efficient. Rather, the results are based on the "average" state-of-the-art, not the most productive one.

Finally, and most important, no one set of average findings is readily applicable to all student populations under all conditions. A good approach for teaching white children does not seem to be very effective for black ones or Mexican American ones, and the same differentiations must probably be made for other sociocultural types with different learning characteristics.[46] Some other complications are introduced by the multidimensional nature of educational outputs.[47] Thus, while educational production function estimates are interesting in an explorative sense, their direct application to public policy must be done with great circumspection.

Allocative Efficiency and Empirical Results

The fruits of educational production function analysis can be used to derive implications for allocative efficiency in two ways. As the reader will recall from equations (1), (2), and (3) above, an allocatively efficient school is one that purchases that combination of inputs which maximized the potential educational impact of its budget. Under such conditions the school is obtaining an equal addition to output from an additional dollar spent on any input. If the production function analysis suggests that no additional output is forthcoming from increasing a particular input (e.g. teacher degree level), then to devote additional resources to that input is inefficient. That is, if a resource shows no relation to output, allocative efficiency would require that none of the resource be purchased regardless of its price. One must be very cautious, however, in applying this principle to the findings of present studies since the lack of an observable relation may be attributable to the crudeness of the measurements and the models underlying the analysis rather than to the lack of a true relation.

Given significant statistical associations between several inputs and educational output, one might like to explore the relative efficiency of allocating more of the budget to each of the several inputs. As in equation (3), one requires both the marginal product or accretion to output for each additional unit of input as well as the prices of each input. On the basis of these data one can estimate the allocative pattern among inputs that will yield the largest increase in output within a limited budget. Few such studies have been carried out for educational production, in part because the "prices" of such inputs as teacher characteristics are difficult to derive.

An early investigation into this area has suggested that obtaining teachers with higher verbal scores is five to ten times as effective per dollar of expenditure in raising student verbal score than a strategy of obtaining teachers with more experience.[48] The implications of this finding are that schools might derive higher student verbal performance by emphasizing the recruitment of more verbally able teachers rather than a more experienced teacher complement. The nascent stage of development of cost-effectiveness applications in education must surely qualify the use of such findings until they are firmly validated by additional inquiry.

Empirical Findings on Size and Efficiency

The theoretical reasons for expecting both very large and very small schooling units to be inefficient were outlined above. What are the empirical findings on this subject? Studies on efficiency and size can be divided into two types: those that explore the relationship for individual schools and those that examine it for school districts. Clearly, adequate studies in this area must consider the nature of the student population as well as educational outcomes in examining the association between size and performance.[49]

Studies of school district size have indicated no evidence of economies of scale for the range of districts under consideration. That is, the larger districts did not appear to be outperforming smaller ones in standardized achievement scores once student inputs and school expenditures were accounted for.[50] Indeed, Kiesling found that under certain conditions the size-performance relation was negative, suggesting that large districts were less efficient than smaller ones.[51] These studies did not concentrate on the very small rural districts where economies of scale in resource use are obvious. Even when such districts were consolidated they often had a student population for all grades that was a fraction of the enrollment of a single, urban elementary school.[52]

Neither have these studies examined the particular implications for educational efficiency of the very large, urban school districts, those with over 100,000 students. The very poor performance of those units has recently become a topic of immense concern as evidenced by the major inquiries carried out for New York City and Los Angeles, the two largest school districts in the country.[53] Apparently, the cumbersome nature of the very large urban districts leads to substantial waste and inefficiencies in their operation.

For example, it was found that reading scores in schools attended by middle-class children in Los Angeles were no better than those of children from much lower socioeconomic backgrounds who were attending schools in the smaller districts surrounding Los Angeles.[54] Furthermore, the relative deficiencies in performance of the Los Angeles students did not appear to be related to differential expenditures among districts.[55]

The studies on high school size, too, indicate no evidence of economies of scale and at least some suggestion of diseconomies of scale. Kiesling examined the relationship between standardized test scores of students and school size while statistically adjusting for differences in school expenditures and student background.[56] In addition, he carried out separate analyses for students at each of four socioeconomic levels. Using achievement tests in different skills as measures of educational outcome, Kiesling found a rather consistent negative relationship between high school size, as measured by average daily attendance and average test scores. That is, over a large range of school sizes—less than 200 to almost 4,000 in average daily attendance—the apparent relation between school size and student performance was negative.

Burkhead and his associates found no significant statistical association between school enrollments and several measures of educational outcome once differences in student backgrounds and school resources were accounted for.[57] The Burkhead analysis was carried out separately for high schools in Chicago, Atlanta, and a set of small communities. The measures of educational outcomes included test scores, relative changes in test scores among high schools between grades, dropout rates, and post-high school educational plans or actual college attendance of graduates. While two studies have suggested that the optimal high school size is in the 1500 to 1700 student range, neither study takes account of differences in student characteristics among its sample.[58] It might be noted that the Project Talent sample of large city high schools showed an average daily attendance level of 2,500.

The evidence on the size-performance relationship suggests that high schools and school districts at the high end of the spectrum probably suffer from substantial diseconomies of scale. No study has found that such units yield economies of scale, and several inquiries have obtained the opposite result. In this area as in others there are data gaps. For example, there exist no rigorous studies on elementary school size, and the major sources of scale inefficiencies have not been delineated in adequate detail. Yet, the reduced effectiveness of very large schools has certainly been documented in other types of studies, for example, reduced student participation.[59]

IMPROVING THE EFFECTIVENESS OF EDUCATIONAL DOLLARS

In the preceding sections the conceptual linkages between expenditures and educational outcomes were described. Moreover, empirical studies of the educational production and expenditure relationships were surveyed in order to suggest certain insights into improving the effectiveness of educational dollars. In this final portion we will focus on the implications of this analysis for financing education.

As we stated previously, there are at least three obstacles to obtaining schools that are more productive. These hurdles include (1) the lack of an information system; (2) seemingly limited management discretion over inputs; and (3) the absence of incentives to stimulate the achievement of the school's putative goals. If schools are to improve their performance, all three of these institutional impediments must be overcome.

Information Systems

Given the complex nature of the educational process, the need for information on which to evaluate and make decisions is crucial. Yet, the schools lack such capabilities. This is not to say that the schools lack data, for most of them have reams of computer printout, shelves of reports, and files of records as a testimony to their penchant for numbers. It is the dearth of appropriate data for management decision-making at all levels that is the problem. That is, most of the existing numbers serve no useful function other than to be stored or compiled in reports that themselves have little usefulness.

In order for the schools to monitor their on-going operations, to improve their decision-making capabilities, and to raise the proficiencies of their research and evaluation functions it is necessary to develop a school information system that would provide data for both management and research needs. Moreover, this information system must be linked to a school management system that would use these data to make optimal educational decisions at the school district, school, department, classroom, and individual student levels.[60]

What would be some of the requirements of such a system? First, the educational enterprise needs better information about its own operations and performance. In this regard there must be emphasis on evaluation and outcomes of existing programs as well as on the linking of costs to particular programs. Moreover, this process should feed in to a planning, programming, budgeting system that will improve the allocative efficiency of educational expenditures.[61] Second, such a system would devise better ways to communicate the priorities of the various clientele of schools to decision-makers. The schools serve a large number of different constituencies, and the communication of goals from many of these is largely a roundabout process. Students, teachers, administrators, parents, taxpayers, and the various levels of government represent some of the groups with legitimate but often conflicting views on educational matters. The priorities of these groups and their own information needs to judge the schools should be reflected in the information system.[62]

Third, the educational system needs better information about available educational technologies. In order to evaluate alternative processes such data are crucial; yet, often the only source of information is that of the progenitors or promoters of the technologies. A good information system would develop objective descriptions and analyses of alternative approaches with comparable information on costs, required resources, organizational support, and documented outcomes.

Fourth, the educational systems need to develop improved techniques for decision-making in order to utilize properly their information systems. Decision-makers at all levels must learn alternative ways of making decisions as well as data requirements and uses. That is, concomitant with the development of the information system, there needs to be a growing capability to use information feedbacks proficiently.

Management Discretion

Even with better information, the productivity of schools will not rise unless those data are used to improve the schooling process. Yet, there is abundant evidence that even the present impoverished data system is not used to any great degree. While testing is a standard feature of the educational system, the results are rarely used in a systematic way to diagnose the educational needs of particular students or groups of students.[63] Moreover, the present use of such information seems to be plagued with errors in a system where few meaningful decisions are made.[64]

For a variety of reasons the schools seem to lack the capacity to deviate from tradition, even when those traditions are failing. Each participant in the process sees himself as a hired hand with little decision-making authority. The school board perceives a very limited role by virtue of the State Education Code, taxpayer pressures, student activity, contractual agreements with teachers and administrators, and other obligations. The superintendent must deal with the same forces and with his school board besides. Moreover, the teachers, administrators, and students see their decision-making options truncated severely by all of the other forces. All of these countervailing perceptions result in a form of institutional constipation where no substantive decisions are made or can be made. Thus, the schools are run on the basis of archaic mandates, written and unwritten, which all of the participants have tacitly accepted.

Under such conditions, what is publicized as change and innovation is only skin deep, yet neither the director not the producer, actors, stagehands, or audience have the real power to alter the direction of the drama. Rather the scenery is changed with the hope that the script will change too. Instead, the traditional litany whines on and on.

A way must be found to free the logjam of decision-making power so that information feedbacks can be used at all levels to improve the functioning of schools. Management discretion in this sense refers to the ability of all of the participants to make meaningful decisions that affect the educational setting at the level in which they are involved. Within this context, management discretion is required at the individual classroom and individual student level as well as those levels more remote from the classroom situation. Only when incentives are granted for improving educational outcomes can we expect the participants to place their judgments on the line.

Incentives and the Educational Enterprise

By far the most important ingredient for improving the productivity of schools is that of an appropriate set of incentives. Both adequate information systems and managerial discretion are themselves functions of the nature of the rewards and sanctions for developing data and for making decisions. If these two activities are essentially unrewarded or even penalized, they will be discouraged by the schools. Indeed, the fact that the educational enterprise focuses its rewards on seniority rather than on either of these two activities or educational outcomes is itself an explanation of the reverence for an educationally insensitive form of traditionalism.

It is only when the rewards of the educational organization are linked more closely to the goals of the schools that substantial improvements in dollar productivity will occur. It would appear that the systematic incentives that are appropriate are ones which would reward primarily educational responsiveness to the needs of the students and families who are served. Two kinds of models have been posited that would pursue these goals: the market approach to schooling and the political or community control approach.[65]

The Educational Marketplace

The market approach is based upon a plan suggested by Professor Milton Friedman of the University of Chicago.[66] Schools are essentially monopolists in that they provide services for a captive audience. Since most children and their parents have little choice but to attend their local schools—no matter how poor the performance of such institutions—the students are locked in to a system which does not have to satisfy their educational needs. The proponents of the market approach believe that by giving students and their families a choice of schools, and by requiring schools to compete for students, substantial increases in educational effectiveness would result. For, if schools had to compete for students in order to survive, they would likely be much more responsive to the particular needs of their potential clientele.

What are the mechanics of such an arrangement? The state would provide tuition vouchers to parents for a specified maximum sum per year for each child. Parents would be free to use these vouchers at any approved institution of their choice. Institutions would be encouraged to enter the marketplace to compete for students, and any school that met minimal requirements in such areas as curriculum and personnel would be eligible to participate. Thus a system of non-public schools would compete with the public ones for students. Applying this model to the residents of the inner-city, this arrangement ". . . would allow that one section of our population that suffers most seriously from segregated schooling—the poor—to move at their own incentive, and if they want to, in schools of their choice outside their neighborhood."[67] The result of this approach is that ". . . Parents could express their views about schools directly, by withdrawing their children from one school and sending them to another to a much greater extent than is now possible."[68] Information on alternative schools would be provided to all potential participants, in order to ensure an effectively functioning educational marketplace. That is, data on school costs, programs, strategies, effectiveness, and student populations might be required of all approved schools in order to keep parents and potential educational sellers informed of available alternatives. Such an arrangement would induce innovation and experimentation in that each school would try to obtain competitive advantages over the others. Only those public schools which would be responsive to the needs of their students could survive such competition, so a healthy infusion of nonpublic schools into the market would also tend to keep the remaining public schools on their toes.[69]

In addition to the basic Friedman plan there are many other ways of using an educational marketplace to fulfill the social goals set out for the schools. In an excellent discussion on the subject, Anthony Downs has suggested that the cities modify existing attendance boundaries so that all students within a given area of the city can attend any of a number of schools within that boundary.[70] That is, several traditional attendance areas would be merged to form a new one. Schools within the merged area would compete for students, and teachers and other rescources would be shifted from the less successful schools—those whose enrollments decline—to those attracting new enrollments. Portable classrooms could also be added to the latter schools, if necessary. Thus, principals would have an incentive to maximize the important educational outputs desired by the residents of the merged attendance areas or face a loss of clientele and resources.

In a similar vein James S. Coleman has suggested contracting out such services as reading and arithmetic and paying educational contractors only on the basis of their students' results on standardized tests.[71] There are many ways to create competition within the schools, and virtually all of them would provide market-type incentives for utilizing educational resources far more effectively than they had been applied in the past.

Political Incentives

Yet, for large urban school districts the market schema is not the only means of providing incentives for ensuring that schools will fulfill the needs of their clientele. It is also possible to redirect the efforts of such institutions through revamping the political processes by which decisions are made. At the present time educational strategies are set out at some highly centralized level for all children and all classrooms in the urban schools. Personnel, curriculum, and materials are chosen or approved by central school boards and are imposed on a large variety of educational settings for which they are totally inappropriate. Yet, as we pointed out previously, good educational strategies are ones which are made on the basis of the particular characteristics and needs of the children being served. They cannot be set out at a highly centralized, abstract, and depersonalized level just to satisfy an administrative compulsion for order. The drab uniformity imposed by the urban school boards has been particularly disastrous for the inner-city schools where institutions seem to perform the futile exercise of going through motions that have little educational substance.

Under such conditions it becomes imperative to decentralize decision-making from a central school board to some lower level in order to adapt to the different needs of different segments of the population. Indeed, the market approach is an example of such decentralization, while political decentralization is another form. The latter method would put authority for governing the inner-city schools into the hands of groups of citizens who were representative of the community being served by those schools which are characterized by the greatest failures in fulfilling the educational needs of their students.[72]

How would such a system work? Decentralized school districts would be formed in urban areas based upon proximity and commonality of needs among schools. Each decentralized or community school district would elect a representative school board to govern its constituent schools. The central school board would provide each decentralized school board with a lump-sum budget, and each local board would possess substantial discretion in allocating its budget.[73] Financial accounts and accountability would remain in the hands of the central school authority, but the actual disbursements for each school could be authorized only by the local governing board for that school. On the basis of this decision-making power the local governing boards, in conjunction with administrators and teachers (and perhaps student representatives), would construct their programs and purchase the necessary components to implement them, a course of action which is not permitted under the existing regulations. Political decentralization would then enable schools to reflect more closely the educational needs of their constituents. The inner-city schools would be pressured to break out of the pattern of ineptitude fostered by the mindless universalism of traditional big-city school administration.

Both political and market incentives could be combined to make the schools more effective. Under a system of decentralized schools, students should be given a choice of attending a school in their own community or in any other community. Moreover, the central school board would continue to operate a few schools as alternatives to both individual students and parents—via market choice—and to groups of students and parents—via political action within the community.

Further, the decentralized school districts might find it desirable to purchase some services from private contractors. The community school board would plan its educational requirements and compare these with its capabilities. The school board would then solicit bids from industry, universities, and nonprofit groups for fulfilling objectives in those areas where the local district had the least proficiencies. Educational contractors would compete for the particular services which the community wished to buy, and remuneration might be based on the success of the programs.

A Purview of the Future

What are the prospects for widespread reforms in the structure of education, ones that would improve the functioning of schools and the effectiveness of educational dollars? If one were to use a historical perspective, one could not be very optimistic. After all, almost 200 years ago writers like Adam Smith pointed out what might happen to schools if the clientele possessed no sanctions for keeping schools accountable for results.[74] In a more general context Jeremy Bentham issued a similar analysis.[75]

Yet, ideas that were merely on the drawing board in past decades or were not even yet pipedreams some ten years ago have emerged as operational plans in several settings. The state legislatures of Michigan and New York have mandated forms of political and administrative decentralization for the schools of Detroit and New York respectively. The California Legislature was considering such a plan for Los Angeles in the summer of 1970.

Educational performance contracting is being implemented at several sites by both the U. S. Office of Education and the Office of Economic Opportunity. Under such arrangements contractors are being paid to produce particular results, for example raising reading scores. Provisions of the contract specify greater remuneration for succeeding beyond a prescribed level as well as financial penalities for failure to achieve that level. At this date it even appears that a tryout of an educational voucher plan seems imminent in an experiment to be financed by the Office of Economic Opportunity.[76]

Perhaps the most prophetic sign is the grotesque world that the schools are entering. Expenditures are rising very rapidly with little or no demonstrated increase in educational outcomes. Local taxpayers are revolting and state coffers are stretched, but costs continue to rise while little educational progress is being made. Suddenly we are caught as Alice was in *Through the Looking Glass* when a bedraggled Alice running as fast as she possibly could always found herself back in the same place that she started from. The Queen told Alice that in order to actually get anywhere one must run at least twice as fast as that. Given this hopeless alternative, a widespread movement towards educational reform seems inevitable.

FOOTNOTES

1. Kenneth A. Simon and W. Vance Grant, *Digest of Educational Statistics*, 1968 edition, (Washington: U.S. Department of Health, Education and Welfare, 1968), p. 61.

2. For some detail on the educational aspects of these youngsters, see A. Harry Passow et al., *Education of the Disadvantaged* (New York: Holt, Rinehart, and Winston, 1967).

3. Harry Picariello, "Evaluation of Title I" (mimeo, 1969), p. 1. To be published in *Inequality: Studies in Elementary and Secondary Education*, Joseph Froomkin and Dennis J. Dugan, eds., Office of Program Planning and Evaluation. Planning Paper 69-2, U. S. Office of Education.

4. *Ibid.*

5. David G. Hawkridge, Albert B. Chalupsky, and Oscar H. Roberts, "A Study of Selected Exemplary Programs for the Education of Disadvantaged Children," Part I, Final Report, Project No. 089013 for the U. S. Office of Education, Office of Program Planning and Research in Behavioral Sciences, 1968).

6. Thomas I. Ribich, *Education and Poverty* (Washington, The Brookings Institution, 1968).

7. James S. Coleman et al., *Equality of Educational Opportunity*, OE 38001, (Washington: U.S. Office of Health, Education and Welfare, 1966).

8. *Ibid.*

9. For an analysis of the understatement of school effects see, Samuel S. Bowles and Henry M. Levin, "Determinants of Scholastic Achievement—An appraisal of Some Recent Evidence" *The Journal of Human Resources*, III, 1 (Winter, 1968), 3-24.

10. The analysis that follows assumes some knowledge of economic theory. Readers who do not have familiarity with these aspects can obtain background by referring to any textbook that addresses itself to the theory of the firm. A good source is William J. Baumol, *Economic Theory and Operations Analysis*, 2d ed. (Englewood Cliffs, N. J.: Prentice Hall, 1963).

11. For a comprehensive study on educational production functions see Samuel S. Bowles, "Towards an Educational Production Function," Paper Prepared for the Conference on Research in Income and Wealth (Madison, Wisconsin, November 1968), mimeo.

12. While the effectiveness of schools is often measured by student scores on standardized achievement tests, the measure of outcomes suggested by *A* would be far more comprehensive. See for example, Benjamin Bloom, ed., *Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain* (New York: David McKay Co., Inc., 1956); and D. R. Krathwohl, B. S. Bloom, and B. B. Masia, *Taxonomy of Educational Objectives* (New York: David McKay Co., Inc., 1964).

13. For example, see Jesse Burkhead et al., *Input and Output in Large-City High Schools* (Syracuse, N. Y.: Syracuse University Press, 1967). For some technical problems encountered in measuring change scores see L. J. Cronbach and L. Firby, "How We Should Measure Change—Or Should We?" *Psychological Bulletin* (Forthcoming, 1970).

14. For an interesting study that gives insights into these differences see Ellis G. Olim, Robert D. Hess, and Virginia Shipman, "Role of Mothers' Language Styles in Mediating Their Pre-School Children's Cognitive Development," *School Review*, 75, 4 (Winter, 1967), 414-24.

15. In the standard terminology of price theory that combination of inputs is utilized which equalizes the marginal product/price ratios of all of the inputs while just exhausting the budget.

16. For example, such *administrative* expenses as those for principals, clerical, and secretaries in a school building are attributed to the *instructional* budget. See U.S. Department of Health, Education, and Welfare, Office of Education, *Financial Accounting for Local and State School Systems*, State Educational Records and Reports Series: Handbook II OE-22017 (Washington, 1957).

17. See Harry J. Hartley, *Educational Planning-Programming-Budget-*

ing: A Systems Approach (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1968).

18. A proposal for developing such systems is found in Eric Hanushek and Henry M. Levin, "Educational Information Systems for Management and Evaluation—A Proposed Program," Rand Document D-20073, The Rand Corporation (Santa Monica, California, 1969).

19. Indeed, it is not at all clear what the schools are trying to maximize. For a discussion of the school as an organization see Charles E. Bidwell, "The School as a Formal Organization," in *Handbook of Organizations*, James G. March, ed. (Chicago: Rand McNally and Company, 1965), pp. 972-1022.

20. Of course these are not mindless if one accepts the view that the primary goal of the schools is to provide career jobs to persons supporting entrenched political interests. See Peter Schrag, *Village School Downtown* (Boston: Seacon Press, 1967).

21. For a more general analysis of constructing performance incentives in the public sector see Charles L. Schultze, *The Economics and Politics of Public Spending* (Washington: The Brookings Institution, 1968).

22. See for example Lee J. Cronbach and Richard Snow, *Individual Differences in Response to Instruction* (Stanford, California: Stanford University, 19693 mimeo. Obtainable from the ERIC System of the U. S. Offices of Education, ED- 029001. For an economic interpretation see Stephan Michelson, "Equal Protection and School Resources," *Inequality in Education*, 1, 2 ____, 4, 9-16.

23. See Henry M. Levin, "Cost-Effectiveness Analysis of Instructional Technology–The Problems," to be published in a volume by the Commission on Instructional Technology (Washington, D.C.), forthcoming in 1970.

24. A good description of the cumbersome and unwieldy nature of the large-city schools is found in Christopher Jencks, "Is the Public School Obsolete?" *The Public Interest*, 2 (Winter 1966), 18-27.

25. For a review of early studies see William E. Barron, Measurement of Educational Productivity," in *The Theory and Practice of School Finance*, Warren E. Gauerke and Jack R. Childress, eds. (Chicago: Rand McNally Company, 1967), pp. 279-308.

26. Evidence on some of these cost differences is found in Henry M. Levin, "Financing Education for the Urban Disadvantaged," pp. 5-6.

27. A good example of this inadequacy is found in the expenditure information for the massive, nationwide survey of secondary schools, *Project Talent*. The Talent questionnaire made no attempt to be precise about which one of the many school expenditure measures that school districts tally was the one desired by the survey. School districts report several measures of total expenditure, some including capital costs, summer school adult education, and so on, while the best overall measure that reflects elementary and secondary resources is that of the operating budget. Capital costs tend to be lumpy, varying substantially from period to period because the financing period for capital construction is generally considerably shorter than the life of the capital. Thus it is an inaccurate reflection of capital inputs for an annual accounting period. The Coleman Report also used an erroneous expenditure measure. See Samuel S. Bowles and Henry M. Levin, "Determinants of Scholastic Achievement—An Appraisal of Some Recent Evidence," pp. 8-10.

28. See particularly Paul Mort, "Cost Quality Relationships in Education," *Problems and Issues in School Finance*, edited by R. L. Johns and Edgar L. Morphet (New York: National Conference of Professors of Educational Administrational Administration, 1952). Also see William E. Barron.

29. Thomas I. Ribich, *Education and Poverty* (Washington: The Brookings Institution, 1968).

30. Pp. 86-87. It should be pointed out that the dollar comparisons should be interpreted as relative ones since they reflect school expenditures in 1960. Current expenditures per pupil in public elementary and secondary schools increased from $375 in 1959-60 to about $620 in 1967-68.

31. Herbert J. Kiesling, "Measuring a Local Government Service: A Study of School Districts in New York State, " *Review of Economics and Statistics*, XLIX, 3 (August, 1967), 356-67.

32. Kiesling's use of IQ scores as an explanatory variable probably biases downward the observed expenditure effect since so-called IQ tests measure school influences as well as other environmental influences and innate abilities. Accordingly, there is reason to believe that some of the variance in achievement scores attributed by Kiesling to student IQ is, in fact, a proxy for the effect of expenditures on IQ. In a later study Kiesling found that by removing IQ from the equation both the magnitude and significance levels of the estimated expenditure effect rose markedly, usually by almost half or more. See Herbert J. Kiesling, "High School Size and Cost Factors," Final Report for the U.S. Office of Education, Bureau of Research, Project No. 6-1590 (processed; U.S. Department of Health, Education, and Welfare, March, 1968), p. 41.

33. P. 359.

34. For a fuller discussion see Stephan Michelson, "The Association of Teacher Resourceness with Children's Characteristics," in *Do Teachers Make a Difference?*, Alexander M. Mood, ed., OE 58042, U.S. Department of Health, Education and Welfare (Washington: U.S. Government Printing Office), pp. 120-68.

35. P. 365.

36. For example, see Jesse Burkhead et al., *Input and Output in Large City High Schools* (Syracuse: Syracuse University Press, 1967); Samuel S. Bowles and Henry M. Levin, "More on Multicollinearity and the Effectiveness of Schools *The Journal of Human Resources*, 3 (Summer, 1968), 393-400; Charles S. Benson et al., *State and Local Fiscal Relationships in Public Education in California*, Report of the Senate Fact Finding Committee on Revenue and Taxation (Sacramento: Senate of the State of California, March 1965); Richard Raymond, "Determinants of the Quality of Primary and Secondary Education in West Virginia," *The Journal of Human Resources*, Vol. 3, 4 (Fall 1968), 450-70; and J. Alan Thomas, "Efficiency in Education: A Study of the Relationship Between Selected Inputs and Mean Test Scores in a Sample of Senior High Schools," (Ph.D. dissertation, Stanford University, School of Education, 1962). For a more extensive set of references see James Guthrie et al., "A Survey of School Effectivness Studies," in *Do Teachers Make a Difference?*, pp. 25-54.

37. See all of the studies cited in the previous footnote.

38. The economic theory of teacher markets as it reflects on this phenomenon is described in Henry M. Levin, "Recruiting Teachers for Large-City Schools" (Unpublished manuscript, The Brookings Institution, 1968), to be published by Charles E. Merrill.

39. *Ibid.*, Ch. 5-7.

40. For example, see James S. Coleman et al. Jesse Burkhead et al.; Eric Hanushek, "The Education of Negroes and Whites (Ph.D. dissertation, Department of Economics, Massachusetts Institute of Technology, 1968); Samuel S. Bowles, "Toward an Educational Production Function."

41. James S. Coleman et al., p. 316.

42. See Bowles and M. Levin, "The Determinants of Scholastic Achievement," and John F. Kain and Eric A. Hanushek, "On the Value of Equality of Educational Opportunity as a Guide to Public Policy," Discussion Paper No. 36, Program on Regional and Urban Economics, Harvard University (Cambridge, 1968).

43. See Eric Hanushek, Stephan Michelson, "The Association of Teacher Resourcefulness with Children's Characteristics," and Bowles M. Levin, "More on Multicollinearity and the Effectiveness of Schools."

44. Eric Hanushek, "The Production of Education, Teacher Quality, and Efficiency," in *Do Teachers Make a Difference?*, pp. 120-68.

45. See all of the studies cited in the preceding section.

46. See Lee J. Cronbach and Richard Snow, "Individual Differences in Response to Instruction"; Stephan Michelson, "The Association of Teacher Resourcefulness with Children's Characteristics"; also see Hanushek's

comparison of effectiveness of a similar set of resources for whites and for Mexican-Americans in "The Production of Education, Teacher Quality, and Efficiency."

47. Henry M. Levin, "A New Model of School Effectiveness," in *Do Teachers Make a Difference?* pp. 55-78.

48. Henry M. Levin, "A Cost-Effectiveness Analysis of Teacher Selection," *The Journal of Human Resources*, 5, 1 (Winter, 1970), 24-33.

49. A number of studies have examined the gross relation between per pupil expenditure and average daily attendance or enrollment levels. The fact that these inquiries have not controlled for differences in student characteristics or educational outcomes invalidates them for consideration of the size-performance question.

50. See Herbert J. Kiesling, "Measuring a Local Government Service," for a study of districts in New York State. For California see M. C. Alkin, C. S. Benson, and R. H. Gustafson, "Economy of Scale in the Production of Selected Educational Outcomes," a paper prepared for the American Education Research Association Meetings, Chicago, (February, 1968), mimeo.

51. *Ibid.*

52. See Leslie L. Chisholm, *School District Reorganization* (Chicago: Midwest Administration Center, 1957), Ch. V.

53. Analysis of the 1.1 million student New York City situation is contained in Mayor's Advisory Panel on Decentralization of the New York City Schools, *Reconnection for Learning: A Community School System for New York City* (1967). For the 650,000 student Los Angeles School District see Arthur D. Little, Inc., *Alternative for Reorganizing Large Urban Unified School Districts*, A Report to the California State Legislature, Joint Committee on Reorganization of Large Urban Unified School Districts, 2 vols. (June, 1970).

54. Henry M. Levin, "A Comparison of the Performance of the Los Angeles City School District with That of Other School Districts" in Memorandum to Assembly Committee on Education, State of California Legislature, from the Joint Committee on Reorganization of Large Urban Unified School Districts, August 10, 1970.

55. *Ibid.*

56. Herbert Kiesling, "High School Size and Cost Factors."

57. Jesse Burkhead et al.

58. John Riew, "Economies of Scale in High School Operation," *Review of Economics and Statistics*, 41 (May, 1959), 232-41; and Elchnan Cohn, "Economies of Scale in Iowa High School Operations," *Journal of Human Resources*, 3, 4 (Fall, 1968), 422-34. The Riew study also lacks measures of educational outcome and bases its findings on "educational offerings."

59. Roger G. Barker and Paul V. Gump, *Big School, Small School* (Stanford: Stanford University Press, 1964).

60. For greater detail see Hanushek and Levin, "Educational Information Systems For Management and Evaluation."

61. See Harry J. Hartley. Also see Selma J. Mushkin and James R. Cleaveland, "Planning, Programming, Budgeting System," in *Interdependence in School Finance: The City; The State; The Nation*, NEA Committee on Educational Finance (Washington: 1968), pp. 59-98.

62. See James S. Coleman and Nancy Karweit, "Multi-Level Information Systems in Education," Rand Document 19287-RC (Santa Monica, California: The Rand Corporation, 1969), processed.

63. Richard M. Jaeger, *Designing School Testing Programs for Institutional Appraisals An Application of Sampling Theory* (Ph.D. dissertation, School of Education, Stanford University, 1970).

64. See James S. Coleman and Nancy Karweit, "Measures of School Performance," R-488-RC (Santa Monica, California: The Rand Corporation, 1970).

65. The following description is substantially similar to a section of my paper, "Financing Education For the Urban Disadvantaged" in *Education*

for the Disadvantaged, Sterling M. McMurrin ed., to be published by the Committee on Economic Development (1970).

66. "The Role of Government in Education," in Robert A. Solo ed., *Economics and the Public Interest* (New Brunswick, New Jersey: Rutgers University Press, 1955), pp. 123-44.

67. Theodore Sizer, "Reform and the Control of Education," 1967, p. 14, (mimeo.) For similar views see Christopher Jencks, "Is the Public School Obsolete?" *The Interest* (Winter, 1966), pp. 18-28.

68. Milton Friedman, p. 129.

69. For a fuller discussion of the benefits and problems associated with the market plan, see Henry M. Levin, "The Failure of the Public Schools and the Free Market Remedy," *The Urban Review,* 2, 7 (June 1968), 32-37 Also available as Brookings Institution Reprint 148.

70. See "Competition and Community Schools," in *Community Control of the Schools,* Henry M. Levin, ed., (Washington: The Brookings Institution, 1969).

71. See James S. Coleman, "Towards Open Schools," *The Public Interest* (Fall, 1967), pp. 20-27.

72. For an extensive discussion of many of the issues see Henry M. Levin, ed., *Community Control of the Schools* (Washington: The Brookings Institution, 1969).

73. For more details see H. Thomas James and Henry M. Levin, "Financing Community Schools," in Levin, *Community Control of the Schools.*

74. Adam Smith, *The Wealth of Nations,* Modern Library Edition (New York: Random House, Inc., 1937), p. 737.

75. Jeremy Bentham, *The Handbook of Political Fallacies,* Harper Torchbooks (New York: Harper and Brothers, 1952), pp. 17-24.

76. See *Education Vouchers,* A Preliminary Report Financing Education by Payments to Parents (Cambridge, Massuchetts: Center for the Study of Public Policy, March, 1970).

CHAPTER 7

The Effect of Educational Spending on Poverty Reduction

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Very likely, the reduction of poverty will continue to be a major objective for the United States over the coming decade. Though other economic and social goals may very well command relatively more public attention, it can still be anticipated that progress against poverty will figure significantly in a wide range of public policies. Educational spending is one of several types of policies where that consideration is likely to play an especially important role. In trying to determine what influence poverty reduction will and/or should have on educational spending decisions it is critical to know how effective such expenditures are in bringing about an eventual reduction in poverty. Analyzing that effectiveness and what that in turn implies for educational spending plans are the purposes of the present chapter.

THE LINKS BETWEEN EDUCATIONAL SPENDING AND POVERTY REDUCTION

Increased public spending on education is hardly the most direct way to attack the problem of poverty. Indeed, it is one of the most indirect. A lengthy chain of events must successfully transpire before the extra spending is ultimately reflected in a reduction in poverty. The precise sequence need not always be the same, but there are four basic steps that must occur, in most cases, before the intent of the spending is finally realized. First, the dollars spent by some governmental authority must result in augmented educational resources used in schools. Those extra resources must then give rise to some additional learning on the part of individual pupils. Next, the additional learning must lead to an increased capacity for individuals to be more productive and hence capable of earning greater income. Finally, that capability must result in moving individuals out of the poverty classification or at least mitigating the degree of poverty experienced. These four steps are merely the bare requirements. Within each basic step a number of more detailed happenings must occur, with the entire process frequently stretching over a very long period of time.

Since the effectiveness of educational spending will depend on the relative success of accomplishing each of the above steps, each deserves some individual attention. The first portion of this chapter contains a separate analysis of each step with several purposes in mind. Among the important goals are to identify the determinants of relative success at each stage, to evaluate the slippages that might take place, to establish criteria for judging the advisability of making a particular educational expenditure, and to provide a basis for calculating the "appropriate amount" of total spending to be undertaken. This discussion is framed in general terms, preparing the way for the more specific discussion of statistical evidence in the latter part of the chapter.

Dollars as a Measure of Foregone Alternatives

Starting with the dollar amount of spending is convenient for more than the reason that this is the initial focus of attention of budgetary officials. Dollars also provide a handy unit of account that facilititates the comparison of alternative actions. The dollars spent on a given educational program should not be thought of as mere money, but rather as a relinquishment of some other type of educational program, or some other type of anti-poverty program, or some other variety of good or service, either public or private. The dollars given up should be used to express how much of something else is indeed relinquished and it is this dollar's worth of an alternative foregone that is appropriately considered the true cost of the program.

Exactly what is given up depends largely on the level and type of public authority making a budgetary decision. The options available will vary markedly for different types of decision units. A local school board will have a fairly narrow range of educational options to evaluate when contemplating allocations of its available budget. The U.S. Department of Health, Education and Welfare will have a far wider range of options to consider. Legislative bodies and the public at large must decide among a still wider range of possibilities.

The basis for deciding upon which budget allocations to make and which to forego can be legitimately influenced by a great many considerations. Poverty reduction is only one of many possible social goals that might be influential, but it can be an overriding consideration in many sorts of decisions and will in any event be the major concern of the present analysis. If poverty reduction is the main consideration involved in a given budgetary decision, then the dollar amount spent on one sort of program can be evaluated in terms of how much poverty reduction this brings about as compared to the poverty reduction occuring if the dollars are spent on some other program. Estimating the poverty reduction that can be had from a given educational expenditure is therefore only half the battle. The antipoverty effect of spending the same amount of money on another sort of program must also be estimated. In addition, we would usually wish to look into other effects besides those on poverty. The analysis of alternatives will be picked up at a later stage, and so will the matter of other goals besides poverty reduction. For the present, attention is turned to the first steps in the transmission of educational spending into poverty reduction.

From Dollars to Educational Inputs

Before dollars of educational spending do anything about poverty, dollars must first be transformed into goods and services useful in the classroom. The major exceptions to this rule involve programs that hire the poor to help in conducting an education program or subsidize the poor for their participation as students. The paraprofessionals used in Head Start programs are a prominent example of the former, and the wages paid to Neighborhood Youth Corps participants and job trainees are examples of the latter. Educational programs with these elements in them assure that such programs will alleviate at least some poverty. That is a desirable attribute, but it does not guarantee that such programs are on balance preferable. Educational programs that concentrate on increasing or improving professional staff or augmenting other resource inputs may have appreciably higher long run payoffs; and other public service and public works programs which also employ or subsidize poor individuals (e.g. neighborhood improvement programs) may result in larger additional benefits to poor individuals, flowing from the goods and services provided, than do education programs having some immediate poverty alleviation effect. Hence, even with educational programs which entail some direct personal income gains for those in poverty, it is necessary to inquire into their educational effectiveness as well. And for most education programs, it is only through educational effectiveness that any appreciable anti-poverty effect will be experienced.

Spending and Educational Inputs

Spending on education can be channeled into many different types of enhanced educational resources. Quantity and/or quality can be improved—more teachers and better teachers, more books and better books are all purchasable. The resource inputs can take the form of both intensive and extensive change—a greater concentration of educational resources can be packed into the same number of school years of the same length or the time involved in the educational process can be lengthened by dropout prevention programs, preschool programs, or by elongating the school year, each of these requiring and made possible by additional resource inputs. Indeed, there is very little in the way of desirable educational inputs that money cannot buy. Even something as illusive as improved teacher motivation and attitude can be considered purchasable educational inputs. They can be obtained by such means as sensitivity training of teachers, incentive payments, and the recruitment of desirable individuals, all of which can be had by additional spending conducted in an appropriate fashion.

This is not to say that all educational improvements require additional spending. A different combination of educational inputs, costing no more than the original set of classroom resources, may bring about improvement. And more effective use of present classroom inputs may be accomplished without additional expenditures. But for these kinds of changes to take place on a large scale, rather than as isolated incidents, some appreciable amount of spending may have to occur to finance the discoveries of the improved ways of doing things, to train the teachers in new techniques, or to develop school personnel who are, on their own, capable of combining resources more effectively.

Slippages Between Spending and Educational Inputs

In any event, dollars do not turn into educational inputs automatically. Slippages of one sort or another can occur, as they do in nearly any type of government spending program or, for that matter, in budgetary allocations in any large privately run organizations. The imperfect transmission of educational spending into improved educational resources for poor children is to be expected; what is needed is an inquiry into the implications of this problem in the specific context of trying to reduce poverty.

Three types of slippage have been frequently discussed in critiques of recent government grant programs aimed at children in poverty, especially in relation to Title I of the Elementary and Secondary Education Act of 1965 (ESEA).[1] The first is that educational funds transmitted by a higher level of government to a lower level may simply replace expenditures that the lower level was already making or would have made. The second problem is that funds aimed at helping children who are in poverty may sometimes be diverted at the local level to help nonpoor children instead. The third problem is that the new grants may be difficult to absorb efficiently, that purchases of extra educational resources will be undertaken with inadequate planning and will have little utility in the classroom.

The first problem is a general difficulty with intergovernmental grants that is dealt with in some detail elsewhere in this volume.[2] Only a few brief remarks are called for here. First, to the extent that the educational grants go largely to districts with a heavy proportion of poor families, then even if the grants simply replace local expenditures they may still have a beneficial redistributional element in that those poor families will be spared the burden of higher local taxes. A large part of the saving may, however, be experienced by the more affluent members of the community. Any beneficial redistribution that does take place in this fashion must therefore be regarded as haphazard at best, and not necessarily directed strongly towards those individuals with poverty level incomes. If improved educational resources for poor children rather than hit-or-miss savings on local taxes is the aim, then efforts should be made to avoid a serious slipping of gears at this stage. A tight set of fiscal incentives that rewards communities for additional local efforts is probably the most administratively feasible solution to the problem, though care must be exercised that such incentive arrangements do not penalize too heavily communities which fail to respond to the inducements. A more detailed treatment of this problem and various equity issues associated with different forms of grants are, however, beyond the scope of this chapter.

The second problem—of resources being diverted into the classrooms of affluent children—has somewhat different implications. Such diversion cannot be considered a complete waste, as long as these children benefit from the improvements, but it does undoubtedly reduce the anti-poverty impact of the grants. Nevertheless, this sort of misdirection is only a more intense version of an unavoidable general problem with education as an anti-poverty device. Even if funds do result in resource inputs exclusively for children that are presently poor, some slippage still takes place as far as the goal of reducing poverty is concerned. This is because many poor children will grow up to be affluent even without the assistance of supplementary educational inputs. For a program to be *perfectly* focused for anti-poverty purposes, it should channel resources exclusively to those children who will for certain be poor if supplementary educational efforts are not made. That, of course, is an impossible order to fill, and as long as the reduction of poverty is our aim, we must reconcile ourselves to at least some slippage of this sort. Still, a tightening of the administration of funds and a closer inspection of local educational budgets can contribute to minimizing the diversion of resources to affluent children whose odds of experiencing future adult poverty are predictably slim.

The problem of funds spent on inputs that are useless, or nearly so, must of course be considered a sheer waste. This problem also is resistent to complete solution. No one can avoid bad buys entirely. Ill-considered purchases were perhaps more common than usual in the beginning stages of ESEA, but that was to be expected during such a transition period when many school districts did not fully anticipate the impact of the legislation. More experience with such educational grants will help. A more thorough system of on-sight inspections and the training of more adept local administrators can also help, though probably at some cost.

In short, it can be said that some slip-ups at this stage of the sequence are bound to occur, that the unintended diversion of funds is not at all times a complete waste, that steps can be taken to minimize the problem, but that these may be costly and sometimes not worth the effort.

An alternative way to minimize the above problems is to move decisions on educational spending closer to the point of actual application of the inputs—that is, to rely on local efforts. Several objections could be raised to that alternative. It would entail a bootstrap effort by poor communities who cannot reasonably afford large increases in educational spending; it would be an implicit denial that poverty reduction is indeed a national goal desired by the public at large; and it would ignore the fact that poor individuals move in fairly large numbers from community to community, so that what one school district does in the way of educating poor individuals is not a matter of indifference for other communities. Poverty, in other words, does involve widespread "spillovers" and "externalities", which are conceptually sound justifications for action by large governmental units. The issue is not quite as simple as that, and more detailed discussion of intergovernmental relations can be found in Harvey Brazer's essay further on in this volume.[3] More will be said later, however on the "externalities" aspect of poverty.

Resource Inputs to Learning

Once dollars are converted into resources usable in the education process, the next event that must take place, for there to be hope of anti-poverty effectiveness, is the generation of additional learning. Here too, however, an exception to the rule is worth mention. The exception is that the illusion of learning may at times be sufficient to gain an improved economic position. The best examples of this is the individual who manages to land a desirable job largely on the strength of having a diploma, even though the diploma represents little real learning actually useful on the job. Hence, educational resources devoted to making it possible for some individuals to finish high school may permit those individuals to effectively compete for jobs that were automatically closed to them before.

It is doubtful, though, that many employers are entirely perfunctory about the acquisition of a diploma. Certain skills are normally expected to come with graduation, and an individual who acquires a diploma without any of the skills is likely to enjoy only a short-term advantage at best. Moreover, most augmented resource inputs do not involve such visible signs as a diploma. For most educational spending programs extra learning will be a necessary condition for any poverty reduction to be anticipated.

Relationship Between Inputs and Outputs

For most production processes, an increase in the quality or quantity of inputs, introduced by an experienced manager, is regularly expected to yield an increase in output. There is every reason to expect that the same would hold for education. Measuring with statistical rigor the "output" increase—in this case, the gain in learning—may present difficulties, but most of these are not unlike the problems faced in empirical investigations of other sorts of production processes. To make a long story very short, observation of the effect may be difficult because the additional resource input is small relative to other charges that are occurring simultaneously. The upshot can be difficulty in statistically sorting out the independent influence of the additional inputs from the other influences at work, many of which are unmeasured and unmeasurable. The problem may be so severe as to submerge almost completely any evidence of output response to an input change.

If evidence can be found that additional educational inputs do lead to an increase in learning, one must still be reassured that the other changes that did take place simultaneously did not seriously bias the magnitude of the results, making the learning gains appear either larger or smaller than they really are. Gain alone is not sufficient information—the size of the gain must also be established with some degree of confidence, since the size of the learning gain is presumably related to the size of the subsequent income gain, which in turn is related to the amount of poverty reduction. Self-contained statistical criteria, like the percentage of total variation of individual test scores explained by resource inputs or measures demonstrating that statistically different test scores result when resource inputs are added, are simply insufficient information, as previous studies have made amply clear.[4] The actual magnitude of the gain in relation to the magnitude of the resource inputs is critical if we are to be able to trace forward to poverty reduction and backwards to dollar costs.

Discovering the types of learning that lead to the desired economic outcomes and finding instruments to measure that learning are difficult but solvable problems. They are not yet ideally solved, mainly due to the absence of data on individuals, both for scores on a wide battery of tests and for earnings experience. As a practical matter, some average score on standard tests measuring basic skills must presently suffice (in most instances) as evidence that greater earning capabilities are being acquired. Further research employing suitable data may improve upon this sort of measurement, but there may be fairly sharp limits on what can be achieved by testing procedures. For one thing, it is quite possible that even a comprehensive and cleverly designed battery of tests will fail to detect some important varieties of learning that can improve income-earning capabilities. Certain types of educational experiences may work long-term effects in subtle ways. One implication of this is that evidence of little or no gain on standardized tests should not be taken as clinching evidence that nothing was accomplished by the improvement of educational inputs. The real "test," if the goal is poverty reduction, comes later with evidence of earnings effectiveness.

The sort of slippages that can take place at this stage involve all those sorts of minor and major inefficiencies in the way educational resources are used. If these are considerable then a large increase in educational resources may result in only a small gain in learning. Research and diligence in the application of what we know about the best employment of educational inputs can help, but such efforts are not likely to be cost free.

Even if resources are being used optimally, that does not assure that substantial learning will result from a substantial increase in educational resources. It is quite possible that after the basic essential of conducting classes are available, any additional resource inputs simply do not result in an appreciable difference in learning. The production of learning, like the production of other goods and services, may be subject to diminishing returns, and returns in the form of additional learning may simply become small at a very early stage in our efforts to increase the quality and quantity of resources inputs.

From Learning Gains to Income Gains

Learning can be expected to translate into earnings mainly through the channel of increased productive capabilities. The extra learning could lead to more output and income on the same sort of job, but more often involves a "higher" occupation that was impossible or difficult to hold without the additional learning. The increased productivity does not require some sort of "piece rate" system of pay or some notion of "fair payment" on the part of employers for it to lead to higher income. All that is required is that output of greater quantity or value can be produced by the individual, (than if the extra learning was not mastered), and that employers recognize this and are therefore more anxious to acquire his services. Competition for the individual's services will normally bid up the wage or salary needed to hire and retain him as an employee. Less frequently, the increased productivity will be reflected in attaining, or becoming more successful in, the role of a business proprietor or some other form of self-employment.

Effect of Increased Learning on Income

The productivity that is increased by the learning might take many forms—increased speed at a certain task, greater quality of workmanship, the acquisition of entirely new skills, improved attitude and reliability, increased facility in working with others, etc. A complete listing of possibilities would be very long indeed. It should be remembered that it is not just productivity and income experienced shortly after education is completed that counts, but total lifetime earnings experience. That means that certain basic types of learning may be valuable, not so much for what they do directly for productivity, but rather because they enable an individual to absorb more easily additional learning while on the job. The continual accumulation of on-the-job learning then can lead to more rapid income gains later on. Though the connections between learning and productivity may be many and complex it is still possible that a relatively narrow range of testable learning accomplishments turn out to be predictive of later income. Test scores by individuals tend to be highly correlated, and just a few selective tests of learning may yield income predictions that are nearly as good as those made from a very elaborate battery of tests.

As in the case of learning, it is the size of the increase in earnings that is of critical interest. The larger the gain in learning, the larger the anticipated earnings gain. But the latter may still be a quite small dollar amount for several reasons. As suggested earlier, perhaps the learning that was accomplished was not the correct type for use on the job. Even if the learning was the best possible variety that could have been transmitted, the individual still may find it not very useful in his working career or the sophistication of the learning may far surpass the sophistication of his employment. If these problems are surmounted and the learning really is useful for performing a skilled task, it may still turn out that numerous other individuals are also capable of performing that task relative to the number demanded in the economy. The acquisition of greatly increased skills may therefore be rewarded by a relatively meager wage premium, due to the ordinary workings of supply and demand.

A special inference that should be drawn from the last point is that extra efforts to increase learning and income for very large numbers of individuals will normally result in smaller average gains in income than if only a small number of individuals are involved, even if there is no difference in the average quality of the pupils or the programs. The generation of substantial additional supplies of persons capable of doing more highly skilled work leads to more crowding in those sorts of jobs and a depressant effect on earnings in those occupations. Concurrently, less crowding in the unskilled occupations tends to increase earnings there. It follows that, as we extend a particular educational improvement to larger and larger numbers, the net income gain experienced for each additional person will become smaller and smaller. This untoward development may occur at a very early stage if a large-scale anti-poverty education program is designed to raise individuals by a similar modest amount up the ladder of occupational skills.

Job Discrimination

Last, but not least, the well documented existence of job-discrimination should be noted. Poverty in the United States is disproportionately large among Negroes, and education programs aimed at reducing poverty would justly involve a disproportionate number of Negro children. Yet, the learned productive skills that these individuals acquire may languish if highly skilled occupations are difficult to enter because of discrimination. The important factor is that job discrimination must be more intense for relatively skilled jobs than it is for less skilled ones, otherwise, the amount of income gain associated with extra learning will not be lowered as a result. Unfortunately, observed patterns of discrimination suggest that it is indeed the higher skilled jobs where discrimination is especially intense.[5] There is evidence of recent improvement, but at least some discrimination following this pattern still exists. The average income gain that can be expected from education is thereby less than it would be without discrimination; and education is consequently made a less effective anti-poverty alternative than it otherwise would be. Further progress against discrimination would naturally enhance the effectiveness of education programs.

From Income Gains to Poverty Reduction

Income gains are not necessarily synonymous with the reduction of poverty. To state the extreme case, we would not want to count as a reduction in poverty the income increase received by a millionaire. We also would be reluctant to count as poverty reduction income gains received by U.S. citizens of average income—average income here being typically regarded as a state of affluence. By current standards, poverty reduction involves only income gains experienced by those individuals somewhere in the lower levels of the present income distribution. Two important questions that must be answered at this stage are: can a sensible measure of poverty reduction be constructed; and what are its implications for the measured effectiveness of education as an anti-poverty approach?

Attempts to derive an objective measure of poverty on the basis of nutrition levels and similar notions of "fundamental" needs have met with dubious success. Quite different estimates can emerge, depending on which set of assumptions are chosen.[6] Unfortunately, it would appear that further research along such lines is not likely to improve much upon this state of affairs. Poverty, in common parlance, does not mean the same thing as bare survival; and any attempt to identify some level of real goods and services which separates poverty from nonpoverty (not survival from nonsurvival) must rely on an inherently subjective notion of "fundamental" needs.

The inability to determine objectively the income level separating poverty from nonpoverty does not, of course, mean that the term "poverty" has no meaning or that poverty reduction should be dismissed as a goal for social action. It just implies that poverty will always mean somewhat different things to different people and that any standard "officially" adopted for policy purposes can be little more than some compromise of subjective viewpoints. The definition of poverty must therefore be ultimately traced back to the preferences and attitudes of individuals.

What seems the easiest way to describe our subjective feelings about poverty is to say that it is a material level of well-being, experienced by some individuals, that is so low as to arouse widespread sympathy and willingness to take corrective action for the explicit purpose of raising those incomes. That implies that income gains experienced by those individuals designated as in poverty not only generate direct benefits for that group, but also special indirect benefits for society at large in the form of simply knowing that fellow citizens are suffering less from severe material scarcity. To use the technical term, poverty reduction involves the same conceptual category as public parks, national defense, highways, and the like, as a potential target for collective action.

Many refinements can be, and have been, built on to the basic income definition of poverty,[7] but considering even a sampling of those would take the discussion too far afield. Suffice it to say that these elaborations would not alter appreciably the main line of reasoning that follows, though they would complicate things a great deal.

Once some agreed upon income poverty line is adopted, like the $3,000 yearly income level established in 1963 by the President's Council of Economic Advisors there is next the issue of the units used to tabulate the amount of poverty and poverty reduction. The unit of account most commonly employed is the number of families and individuals with income less than the poverty line level. That standard cannot be rivaled for simplicity, but it does not provide a very adequate description of anti-poverty accomplishments. Its chief flaw is that it fails to record any gains in income that occur within the poverty category. A family or individual must actually cross the poverty line for this to be recorded as progress. It implicitly regards success as complete, or nothing at all.

If this standard is taken seriously, it would logically lead to favoring programs having their chief impact on those individual persons whose incomes are already close to the poverty cut-off line, since this group can be most easily lifted over the line. The desire to achieve a favorable record of measured success could shift program emphasis away from those individuals who are suffering the more severe forms of material deprivation. A responsible policy maker, exercising common sense, would likely avoid such a systematically perverse pattern of program selection. But how then should he or anyone else keep a sensible quantitative record of accomplishments?

What seems to be the best alternative, involving little in the way of added complexity, is the calculation of the "poverty income gap." This notion, originally put forward by Robert Lampman,[8] simply suggests that we count poverty as the total dollar amount necessary to bring the yearly income of all those in poverty exactly up to the poverty line. It is, in other words, the difference between the yearly income of all poor individuals and the poverty line, all added together. If this, then, is accepted as a primary measure of the magnitude of poverty, the quantitative estimate of poverty reduction would be the dollar-volume shrinkage of the poverty income gap. The dollar gain experienced by individuals below the poverty line would be the basic unit of account.

Further refinements can be added, but only at the expense of considerable complexity. Perhaps the most important qualification is that it would be sensible to weight the dollar gains received by very poor persons more heavily than those received by the moderately poor. But this and similar adjustments once again would not alter very much the course of the argument.

Assuming that reducing the poverty income gap is acceptable as the standard for poverty reduction, a fairly direct measure results for comparing program effectiveness. What we can do is compare the costs of various types of programs with the dollar-volume reduction in the poverty income gap. The long chain of events starting with the spending of educational dollars finally comes to an end with some anticipated change in this "end-product," also measured in dollar amounts. The ratio of dollar amount of poverty reduction to dollars worth of cost can then be used as the criterion of efficiency—the higher the ratio the more effective the effort.

But given that we can conceivably calculate this ratio, how do we know if the ratio of dollar of poverty reduction to dollar costs is sufficiently high to warrant acceptance of the educational program? The only test is to examine how high the ratio is for other alternatives. For practically all alternative programs, this estimate can only be made from actual experience and measurement. But we do know something about at least one form of antipoverty assistance, even without detailed investigation, and that is the direct transfer of spendable income. Here, a dollar's worth of budgetary costs can automatically give rise to a dollar's worth of income received by those in poverty. There could be some slippage in that work incentives might be reduced with the introduction of any administratively feasible system of transfers. But recent experimental applications of a negative income tax program, though in a very early and tentative stage, suggest that this effect is very weak and possibly nonexistent in a well designed system.[9] Given this standby alternative of income transfers, it can then be argued that—for an educational spending program to be considered an advisable course of action—the ratio of the dollar reduction in the poverty income gap to the costs of the program must be at least one-to-one. Income transfers apparently can do as well as one-to-one (or nearly so), and there may be other available programs that can do even better.

The most immediate implication of applying the standard set forth above is that it can lead to the rejection of educational programs where total income gains are greater than costs. As suggested earlier, no educational program, regardless of how carefully it is focused on children in poverty, can be expected to lead to income gains that occur exclusively in the poverty range. Some poor children will simply not end up as poor adults even though no special educational efforts are made. Yet, the special educational efforts may raise the incomes of these individuals just as it may for poor children who are heading for a poor adulthood. Moreover, the income gains for the latter group, who are in danger of adult poverty, may end up bringing them far above a poverty level of income, hence part of their income gain would not be counted in a strict estimate of the poverty income gap reduction. A particular education program may therefore be able to pass the standard test of total income gains greater than costs, but fail to pass the more stringent criterion of poverty income gap reduction greater than costs.

This gives reason to wonder whether this criterion is really sensible. Any educational change (or any other public investment, for that matter) which gives rise to income gains greater than costs is usually thought to imply a net gain in economic welfare. If new taxes are raised to pay for such a program there is a strong presumption that this results in a net social gain. Even if only a small amount of poverty is eliminated in the process, it could be argued that the program was really "costless" in the sense that it was accompanied by a gain in total income *net of* initial resource costs. The poverty reduction is free of charge—indeed better than that if total income gains exceed costs—and the educational program can be considered superior to income transfers, where poverty is reduced but there is not accompanying *net* gain in income.

If there are no budgetary constraints this line of argument has strong appeal. More frequently, however, there will be budgetary constraints of one sort or another. Public officials will frequently be faced with attempting to do as much as possible about poverty within a designated budget. Similarly, there will be political pressures to eliminate or reduce a given amount of poverty at minimum budgetary costs, some of that pressure emanating from broad worries about overgrown government budgets but also stemming from a narrow desire on the part of the nonpoor to achieve anti-poverty goals at minimum expense to themselves. With the non-poor in the overwhelming majority, we can expect this pressure to be persistently present. For these reasons, the standard of the dollar volume of poverty gap reduction to costs would seem to be of clear practical interest even though it does imply rejection of programs which might increase net social welfare in the absence of budget constraints.

Two other important implications follow. First, in estimating the effects of anti-poverty education programs, we must be concerned not only with the total level of income gain, but also with its range of variation among individuals and the initial level that the individual gains build upon. The poverty reduction criterion thus requires somewhat more detailed information than does the more common standard of total gains in income. The second point is that large-scale educational changes improving the skills of many individuals may have indirect anti-poverty effects on others, due to the shrinkage in the number of low-skilled individuals. Total income gains will be less as a result of such large-scale changes (as discussed earlier), but the decline in the earnings of skilled workers will likely have little influence on anti-poverty effectiveness since their incomes are still inclined to be in excess of the poverty level. It will be the reduced crowding in the lower skilled occupations, and the consequent increase in earnings rates for these occupations, which will surely be the more influential effect for the criterion of reducing the poverty income gap.

One final issue should be raised in regard to the poverty line, and that is the matter of the *future* definition of poverty. Since poverty is not absolute, the level of income regarded as the cutoff point can and has risen over time as general living standards have increased and viewpoints about material deprivation have changed. The same is likely to occur in the future, and it is the future which is really of interest for educational spending undertaken currently. This suggests that an estimate of how much poverty will be eliminated as a result of such spending should perhaps involve some forecast of where the poverty line will be in the future, so that reduction in the poverty income gap can be measured the way it is likely to be perceived in future periods.

One easily could reject this suggestion on grounds that it is the present day generation doing the spending, and it should be their views on poverty which are rightfully the controlling factor. In addition, it should be remembered that since overall economic progress will be pushing up incomes generally, including those towards the bottom of the economic ladder, the rise in the poverty line will not necessarily mean that there will be a larger proportion of individuals who will be in the poverty category. The poverty income gap need not be an "easier" target to hit in the future. Indeed, past upward movements in officially established poverty lines, over the last several decades, have failed to keep pace with increases in the average level of income, so that the percentage we consider to reside in poverty has tended to fall with considerable regularity.[10] In all probability, simplified calculations of the poverty income gap reduction resulting from current educational spending, based on current figures on income levels and the official poverty line, are slight *over*estimates of how much poverty gap reduction will take place according to future standards.

STATISTICAL EVIDENCE

The foregoing identified many of the elements that can influence the effectiveness of educational spending programs as an anti-poverty device. But the complexity of these influences makes it difficult to have a strong anticipation about the degree of effectiveness that might actually result. Many sorts of possible slippages have been suggested, but casual observation and deductive reasoning give only minor clues as to how important these might be. Formal measurement would therefore seem indispensable. Unfortunately, the complexity is also a major handicap to empirical work. The data requirements needed to measure the effect of educational spending on poverty reduction are very difficult to meet. To isolate the precise reasons for the degree of effectiveness observed is no less difficult a problem. Still, an imperfect empirical answer may easily be worth a thousand pages of speculative discussion.

The discussion of empirical evidence is split into two sections: the analysis of total financial payoff rates, and estimates relating total payoff rates to the reduction in poverty. The first section analyzes attempts to solve the measurement problems associated with the first three steps outlined earlier; the second section concentrates on the last step in the sequence.

Total Payoff Rates

Estimates of the total financial payoff rates for educational spending aimed at poverty reduction must be pieced together from components that are not altogether satisfactory. The available basic data have been gathered for many different sorts of purposes, and are not always in the form most suitable for conducting the ambitious sorts of calculations suggested by the analyses in the first part of this chapter. Often, important pieces of information are missing altogether either because of oversight or the extreme difficulty of acquiring the information. Before getting into the actual calculations a few words are called for on some of the basic data limitations.

Information describing the transmission of educational spending by state or local governments into usable classroom resources for poor children appears to be unavailable in any sort of systematic form. The anecdotal evidence that does exist suggests that some slippage occurs at this stage, but attempting to quantify the average amount of slippage that can be expected over the long term requires a type of empirical investigation that, apparently, has not yet been accomplished.

What is available on costs in systematic form is the amount of educational spending undertaken by individual schools and school districts at particular points in time. Also available are scores on standardized tests for individuals within those schools and school districts for the same points in time. The individuals can be identified by socio-economic status so that we can look directly at learning by poor children. Using before-and-after comparisons, controlled experiments, and cross-section analysis, this information permits calculation of the relationship between dollars spent locally and the learning gains by that group of children whose chances for future adult poverty are especially high.

The calculation of this relationship not only bypasses the initial step of conveying dollars from government agencies to target schools, it also skips over the explicit conversion of dollars into resources. It goes directly instead from dollars to learning. There are two apologies for skipping the resource step. First, for many valid and interesting observations, the detailed information of resource inputs are difficult to obtain. Second, neglecting exactly how individual schools and school districts spend the extra dollars is not critical if the main issue is the effectiveness of educational spending given the current state of efficiency within the schools. For those interested in the effectiveness of grants, and who are not in the business of trying to alter the internal operation of schools and school districts, it does not matter greatly whether the relationship between dollars and learning is more heavily influenced by decisions about which resource inputs are purchased or by how well they are employed in transmitting learning.

These in-between processes are of direct interest to other types of decision makers, however. Moreover, alterations in the composition of school spending or the ability to use various inputs can change; and if such change is taking place or can be induced, this would naturally affect the efficiency with which extra dollars are employed. Further comment on this issue occurs later.

There still remains the question of how to get from observations on learning to estimates of income gain. With presently available information that step cannot be undertaken directly. What can serve as a substitute is to calculate the learning gain in terms of "yearly equivalents" (i.e. the period of time it normally takes to achieve such a gain) and then calculate how much that extra period of time in school normally means for future earnings. The relationship between number of years in school and earnings can be obtained from census data, and various controls can be imposed to isolate (at least approximately) the independent influence of schooling alone.

A number of other technical adjustments are needed to make costs and income gains comparable. Quantitatively the most important is discounting future income gains to put them on a present value basis. Such discounting is always a requirement when we are comparing present with future dollar amounts because of a rationally motivated preference for present dollars over future ones. Present dollars can always earn interest, so that a dollar received or paid now is always more valuable than a dollar paid or received in some future period, the effects of inflation aside. In the work that is described immediately below a 5 percent discount rate was used, though many economists have been prone to use a higher rate, which tends to lower more substantially the present value of future income gains.

The above approach was applied to a fairly wide range of educational spending changes in some recent work of my own.[11] Most of the data were derived from controlled experiments, comparing paired groups of poor children, with one group receiving special standard services. Compensatory education programs, pre-school programs, and dropout prevention programs were all considered. Most of these were programs conducted on a fairly large scale and all had reasonably well executed research designs built into their original formulation as well as adequate cost information. This information was supplemented by a cross-section analysis of Project Talent data involving a 5 percent sample of school districts across the United States. This cross-section data allowed an evaluation of what happens when extra spending is applied continuously for all twelve years of regular public schooling rather than in special programs applied for two or three years (and even less).

The calculations indicate some interesting differences in payoff rates among various types of programs, but what was more interesting was the generally low ratio of estimated total income gains to costs that appeared (on average) for *each* basic type of educational spending change considered. The typical relationship was for income gains to be around 60 percent of costs.[12]

All of this evidence came from programs that were initiated before the start of the big push by the Federal Government to channel more resources into education. This was not by choice but by necessity, since all the data gathering took place at about the same time that the large-scale Federal efforts were just getting under way. No great loss in relevance seemed to result from this, however. The educational changes considered were quite similar to some that were built into the federal efforts. Recent research on the large scale federal program have tended to bear this out.

Fairly complete reports were released in 1969 on both Title I of the 1965 Education Act and the Head Start Program[13] Both show statistically insignificant changes in test scores as a result of these two types of programs. That would suggest Head Start and Title I were doubtful ventures even if they did *not* use up real resources. A statistically insignificant gain in the test scores suggests a statistically insignificant income gain as well. If one ignores the problem of statistical significance and uses the differences that did appear—which were slightly in favor of those experiencing the programs—the test score gain implies a gain in income which is far less than costs.

These observations are consistent as well with the general conclusions of the Coleman Report.[14] There too, educational inputs were judged to be of minor power in altering the amount of learning. The procedure used in the Coleman Report for coming to that conclusion—mainly calculations of the amount of total test score variance explained—has come in for some heavy technical criticism.[15] Still, the weakness of educational inputs on this basis is indicative of similar weakness if the more appropriate sort of calculations had been performed with the Coleman data. The results with Project Talent, where the raw data is quite similar to Coleman's, reinforce that conclusion.

The estimates described above cannot be taken at complete face value. Simplifying assumptions were required to work around data gaps and to keep the calculations manageable. By and large, however, these simplifying assumptions served to bias the results upwards.[16] A more thorough-going analysis based on the same sort of data and general methodology would apparently result in a still lower estimate of the ratio of total financial returns to cost. What is much more important than reviewing these possible biases is the consideration of some other evidence seemingly at odds with the finding of low rates of payoff.

Three varieties of evidence appear inconsistent with the results stated above. The first, and most widely noted, has to do with the calculated rate of return for completing more years of schooling.[17] Such calculations have consistently resulted in income gain estimates that are nearly twice as great as costs if a 5 percent discount rate is used. But these estimates do not directly relate to an available policy option. Strictly speaking, they are only a measure of what happens if an individual makes a decision to complete some extra years of schooling rather than dropping out. For these rates to be relevant to a policy change without further adjustment, there must be a policy available, leading to an increased flow of pupils through extra years of formal schooling, which both (1) ensures that the additional individuals will perform as well as the average of past graduates and (2) does not involve extra costs on top of the usual costs of continuing formal education for some additional number of years. It is quite unlikely that both of those conditions can be met. Indeed, studies of dropout campaigns recently undertaken indicate that the extra program costs for each potential dropout who is successfully induced to graduate are sufficient to drive total costs above total financial gain.[18]

The second dissonant type of evidence is that some compensatory education programs do seem to result in substantial gains in learning compared to costs.[19] It could be argued that the average of past compensatory efforts is not what is relevant, but rather these successful cases; new educational spending might simply be channeled exclusively to those types of programs that "work." Unfortunately, there seems to be an insufficiently distinct pattern of success and failure. It is hard to identify what makes some programs really go well, but the best guess seems to be some combination of fortuitous circumstances and key personnel who are especially gifted or enthusiastic. In any event, there appears to be no one willing to state with strong conviction that there is a particular type of compensatory program that can be widely reproduced with consistent results of large gains in learning compared to costs.

A third type of calculation which can lead to the questioning of low rates of return is the estimated relationship between specific educational inputs and test scores.[20] Indications seem to be that if schools spend additional funds exclusively on certain narrowly defined types of measurable inputs—e.g. on acquiring teachers of high verbal ability—the gain in test scores will be much higher than if the funds are used to buy some typical combination of inputs. The same sort of inference can be drawn for the successful compensatory education program: we need not rely on the average of past experience but can channel funds into the specific inputs that are especially potent. Only here, this line of argument carries more authority. The evidence is not based on isolated incidents but on large cross-section samples. The policy *does* seem reproducible.

The implications of such evidence for the future of educational grants are, however, a little more subtle than they might appear. For educational grants to take advantage of these high-paying channels, there must first be assurance that school districts will change their spending habits. Either that, or the grants must be carefully earmarked for the purchase of the specific input (or inputs) that looks to be high paying, which may involve more interference in spending decisions than school boards are presently prepared to accept. Providing these obstacles are overcome, there is a more basic issue to face. If extra spending on some narrow category of input leads to high returns, but extra spending on a typical mix of inputs does not, that would imply that schools should not merely stand pat on the levels of other inputs currently employed but should actually make cutbacks. Inputs, other than the special ones discovered to be high paying, apparently have very low "marginal returns" compared to costs, otherwise the returns on total educational spending would not be as low as they apparently are. And, by normal operating procedures, very low returns are usually taken as reason for contraction in the use of an input, just as high returns are suggestive of expansion. If we are prepared to alter the input mix on the basis of payoff rates from particular inputs, there are no economic reasons—only political ones—why we should not consider the possibility of contractions as well as expansions of particular resource inputs. That, in turn, means that high returns on specific inputs do not lead to a compelling economic case for more total spending on education.

An additional, and related, consideration should be mentioned at this stage; that is the possibility that strikingly novel ways will be discovered to combine educational resources which in turn will yield substantially increased efficiency in education. Innovation and potential breakthroughs in educational effectiveness are currently very much on the minds of most professionals connected with education. And it is frequently reasoned that such breakthroughs would lead to a clear-cut justification for greater total spending on education. Though such arguments are more in the province of other essays in this volume, they cannot be completely ignored here. Such breakthroughs could very possibly upset and make totally irrelevant the sorts of empirical results reviewed in the preceding pages. But that is the *only* thing that can be stated with certainty. Important innovations, if in fact they do occur, do not necessarily mean that more total resources should or will flow into education. The reason for this is that the innovations in efficiency may be merely cost-saving developments and not changes that make increased total expenditures necessary or even desirable. Just one example: Sesame Street, which costs approximately a penny a day per viewer and which gives strong indications of being a potent learning tool, may very well reduce the need for expanding expensive small-class operations for preschool children.

Total Income Gains, Poverty Reduction, and Large Scale Educational Changes

The earlier analysis of poverty reduction can be put into an approximate quantitative form. It is too difficult with present information, to go as far as actually estimating the distribution in earnings gains for each of the specific educational programs discussed in the last section. We can, though, compare the distribution of earnings between high school graduates and high school dropouts, and from that derive a rough idea of how much reduction in the poverty income gap might be expected from inducing a given number of individuals to graduate from high school rather than drop out. This can then be compared to the total income gain that would be anticipated from the same change.

The basic data for the calculation is derived from the 1960 census. It uses a simple $3,000 income figure as the definition of poverty which is roughly consistent with the income data gathered for that year. The entire lifetime stream of total income and poverty income gap reductions are calculated and discounted to present values. The result of the calculation is that the reduction of the poverty income gap is only one-fifth of the total income gain that would be experienced by a representative example of white individuals, and would be just short of two-fifths for a representative group of nonwhites.[21] Hence, should a sufficient number of potential dropouts be encouraged to graduate from high school, so that total income gains turned out to be (say) $1 million, the expected reduction of the poverty income gap would be somewhere between $200,000 and $400,000: If this relationship is typical for other sorts of educational changes aimed at children and youths in poverty, it would then be legitimate to reduce all total returns estimates to less than two-fifths of that amount to derive the estimate of the reduction in the poverty income gap. Thus, while the calculations discussed in the previous section indicated that total income gains were 60 percent of costs, the ratio of the poverty gap reduction to costs might be no better than 25 percent of costs.

Dealing consistently with the criterion of the poverty income gap would, however, lead to answers that are not quite so pessimistic as that if one also takes into account that the supply of unskilled labor shrinks up in the process of a large-scale educational improvement program. Estimating the amount of that effect is a difficult matter, but preliminary calculations indicate that much of what was lost by adjusting total income estimates to derive a poverty income gap reduction could possibly be regained by taking this effect into account. However, the results are very sensitive to changes in the total number who experience the improved education, the total number who are left competing for unskilled jobs, and to the degree of upward responsiveness of the earnings of unskilled labor to the shrinkage in supply.[22]

In short, calculations for the reduction of the poverty income gap probably will result in a slightly more pessimistic answer than if total earnings are used. It can be stated with much more confidence that the additional considerations introduced by using that standard, or any other reasonable criteria for poverty reduction, make for greater uncertainty in the calculations.

POLICY IMPLICATIONS

If we were confident that both total financial returns and the reduction of the poverty income gap were considerably greater than costs, policy prescriptions would be relatively easy. Pushing hard at all levels of decision-making to channel more resources towards the improved education of poor children would be a quite reasonable and relatively uncomplicated strategy. All that would hold it back would be the problem of convincing the public of the long-range wisdom of such a strategy, and the delay while school districts made adequate preparations to absorb the new resources in an efficient manner. Since education is socially and individually valued for reasons other than the direct income gains, it would make it doubly easy to recommend proceeding at fastest possible speed. Unfortunately the indications that emerge from the available evidence make it difficult to advocate such a straightforward approach. Total returns and the reduction of the poverty income gap both appear to be less than costs. The evidence is not of high enough quality for us to be entirely certain of this fact, but it is at least strong enough to suggest careful consideration of alternative approaches to poverty reduction.

It would make decisions easier if we were absolutely certain that the returns from improved education were very low, and that this was a fact of life that simply had to be lived with. It would also help if we did not hold the belief that education brings substantial individual and social rewards of a nonmonetary character and probably leads as well to indirect economic gains to society that may very well be larger than those generated from other types of public and private investments. The uncertainty and the other potential values of improved education raise a host of questions. Should we perhaps delay commitment of policies until longer-run evidence is accumulated? Can we reduce sufficiently the various slippages by enough to bring returns above costs? Should we experiment on a large scale with alternative educational institutions? Should we go ahead with large spending on improved education, even though it is risky, because we value it greatly for reasons other than direct financial gains? Answering these sorts of questions requires a variety of wisdom that goes far beyond orthodox economic calculations. In practice, they must be resolved by the public and its leaders.

Given these considerations, and many more, the technical knowledge of the economist is not nearly enough to allow specifications of how much future educational spending should be undertaken explicitly for anti-poverty purposes. It can be said, however, that the available information is at least consistent with what appears to be the evolving strategy towards poverty at the national level. Relatively heavy reliance on income transfers and job training—both of which are involved in the Family Assistance Plan recently proposed by the present Administration—seems to be a key part of that strategy. These approaches do give indications of having substantial anti-poverty effects. They do not, at least in their present scope, offer the promise of solving the poverty problem once and for all, but they seem sure of providing help of significant magnitude. In the meantime, Federal spending on improved education for poor children seems to be expanding at what might be described a moderate rate, with considerable encouragement to experimentation and research.

It is exceedingly difficult to predict the outcome of further experimentation and research along these lines. Almost by definition, explorations of the unknown defy a forecast of payoffs; but given the general attractiveness of using education as an approach to poverty, a considerable effort seems justified in trying to make improved education a reliable anti-poverty tool.

FOOTNOTES

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CHAPTER 8

Federal, State, and Local Responsibility for Financing Education

HARVEY E. BRAZER

That the responsibility for financing primary and secondary education in the United States should be shared by all three levels of government within the federal structure commands widespread acceptance. There do exist, however, continuing pockets of resistance to federal aid, and in some quarters responsible officials and legislators are urging that the local school district's fiscal role be dropped.[1] Thus the task of this chapter is to examine the issues relating to the distribution of fiscal responsibility among levels of government, to identify and define objectives in educational finance, and to evaluate the intergovernmental fiscal instruments that may be employed in seeking those objectives.

We begin by reviewing recent trends in and current patterns of financing education. We then explore the case for local control and local financial responsibility. Following this we move on to look at the justification for the participation of the Federal Government and the states in financing primary and secondary education, the objectives of this participation, and the alternative means of attaining them. Finally, some recent major proposals for changing the role of the states are presented and evaluated.

While I shall endeavor to distinguish between subjective judgments or "mere opinions" on the one hand and "hard facts" and generally accepted principles on the other, the subject matter to be dealt with does not, by its nature, lend itself to the development of noncontroversial prescriptive analysis. And if prescription is to be eschewed here, where are the issues to be intelligently joined? The facts may be said to "speak for themselves" only when they are addressing "value-free" problems or issues. In any meaningful analysis of the role of federal, state, and local governments in the financing of education, however, values are bound to play an important part, unless we are willing to avoid the interesting questions, the questions to which the policymaker must address himself.

It may be best at the outset, therefore, to stipulate some fundamental values underlying my basic approach to the subject. One basic premise inherent in much of the analysis that follows is that in the public as well as in the private sector of the economy we seek to maximize the satisfactions enjoyed by individuals or households. This requires that resources be so allocated as to reflect individual preferences and to achieve efficiency in the sense that each dollar's worth of inputs everywhere yields the same value of output at the margin. This premise involves acceptance of the judgment that the preferences of individuals as consumers, or consumers' sovereignty, rather than imposed authority, is the source of guidelines for determining how much of available resources should be allocated to any activity, including the public supply of primary and secondary education.

Given the existing inequality in the distribution of income and a value judgment that accepts as a policy goal the attenuation of this inequality through equalizing opportunity (however defined), as well as the difficulties involved in ascertaining preferences and the fact that the individual's pursuit of education gives rise to some benefits appropriable only by the community at large, it follows that something more complex than a relentless pursuit of "efficiency" is required. Where values conflict, as may be the case with respect to efficiency and greater equality in income distribution, for example, the resolution of the conflict is essentially a political problem. The economist *qua* economist can do no more, and should do no less, than point up the nature of the conflict and the consequences in terms of costs and benefits of resolving it in one direction or the other.

CURRENT PATTERNS AND TRENDS

Throughout American history the principal responsibility for the financing and administration of public elementary and secondary schools has rested with the local school district. The Federal Government has played only a minor role, beginning with land grants under the Northwest Ordinance of 1787. Grants for vocational education were added during World War I, and the more recent introduction of the school lunch program, aid for so-called federally impacted areas, and Sputnik-inspired National Defense Education Grants for instruction in mathematics and science brought the total Federal contribution to about $650 million by 1960, less than 5 per cent of total school revenues (Table 8-1).

TABLE 8-1
PRIMARY AND SECONDARY SCHOOL REVENUES, SOURCE BY LEVEL OF GOVERNMENT, SELECTED YEARS, 1959-60 TO 1969-70

Year	*Total*	*Federal*	*State*	*Local*	*Total*	*Federal*	*State*	*Local*
	(Millions of Dollars)				*(Per Cent)*			
1959-60	14,747	652	5,768	8,327	100	4.4	39.1	56.5
1965-66	25,357	1,997	9,920	13,439	100	7.9	39.1	53.0
1967-68	31,092	2,472	12,232	16,388	100	8.0	39.3	52.7
1969-70	38,476	2,545	15,645	20,286	100	6.6	40.7	52.7

Sources: U.S. Department of Health, Education, and Welfare, Office of Education, *Statistics of State School Systems, 1959-60* (Washington, 1962), p. 53; U.S. Department of Health, Education, and Welfare, Office of Education, *Statistics of State School Systems, 1965-66* (Washington, 1968), p. 50; National Education Association, *Estimates of School Statistics, 1968-69*, (Washington, 1968), p. 32; and National Education Association, *Estimates of School Statistics, 1969-70* (Washington, 1969), p. 35.

The states, while typically charged with broad supervisory powers in elementary and secondary education, did not contribute appreciably to its financial support until well after the turn of the twentieth century. It was only after 1910 that they began to develop the use of income and, later, sales and excise taxes that gave them the means to assist local units in financing education. By 1960 almost all of the states had adopted major aid programs. These programs accounted for $5.8 billion, almost 40 per cent of all primary and secondary school revenues in that year.

Thus by the school year 1959-60 the Federal Government and the states had assumed responsibility for about 44 per cent of the total of school revenues, while the local districts, primarily by means of their levies on property, still carried 56 per cent of the load.

Growth in School Revenues in the 1960s

This past decade has seen an enormous growth in funds allotted to public elementary and secondary education. Total revenues rose from $14.7 billion in 1959-60 to an estimated $38.5 billion in 1969-70 (see Table 8-1). The states' share of this total increased very modestly, from 39.1 to 40.7 per cent, while state aid grew from $5.8 billion to $15.6 billion, in part because of new aid programs or formulae, but to a far greater extent because of the expansion of old programs to meet rising enrollments and rapidly increasing costs. And although the Federal Government still accounts for less than 7 per cent of total public school revenues, its contribution nearly quadrupled to a level in excess of $2.5 billion, of which more than $1 billion is attributable to distributions under the Elementary and Secondary Education Act of 1965.

The increases in the federal and state shares have, of course, brought some reduction in the proportion of the load borne by local school districts. Thus, while the total of revenues raised locally grew from $8.3 billion to $20.3 billion between 1959-60 and 1969-70, the local share of all school revenues fell from 56.5 to 52.7 per cent. If the 1969-70 estimates are accurate they suggest, when compared with the 1967-68 data, that federal outlays appear to be stabilized until major new legislation appears. The pressures on the federal budget for fiscal 1971 and 1972 are such as to promise little or no increase in aid for elementary and secondary education.

Diversity Among the States in Sources of Revenues

The distribution of school revenues for the nation as a whole, in the proportions of approximately 7 per cent federal, 40 per cent state, and 53 per cent local, is subject to very wide variation among the states. The federal share ranges in 1969-70 from less than half the national average, at 3.2 and 3.3 per cent in Wisconsin and Vermont, to more than three times that average in Mississippi, Wyoming, and Alaska, where it is, respectively, 22.0, 22.3, and 25.7 per cent.[2]

The wide variance in the relative size of the Federal Government's contribution to revenues for elementary and secondary education is attributable to the fact that substantially more than half of federal funds are distributed under the aid to federally affected areas program and, under Title I of the Elementary and Secondary Education Act of 1965, as aid for educationally deprived children. Thus school districts in some states, such as Alaska, may qualify for substantial sums under both programs while others, like Vermont or Wisconsin, being "impacted" by neither large numbers of very poor minority students nor major federal installations, receive relatively little federal money.

Federal aid for elementary and secondary education remains, despite the Act of 1965, a hodgepodge of separate, largely unrelated and uncoordinated, specific grants. For the most part it is aimed at selected circumstances or groups in the population and is designed to achieve special rather than general educational finance objectives.[3]

The extent to which the states contribute to the support of elementary and secondary education varies within a wide range, from as little as 8.5 and 13.6 per cent of total revenue receipts in New Hampshire and South Dakota to 87.0 per cent in Hawaii and 71 per cent in Delaware and North Carolina. This wide variance is demonstrated as well by the fact that, while for the nation as a whole the states are responsible for 40.7 per cent of school revenues, in 14 states this proportion exceeds 50 per cent and in 13 it falls below 30 per cent.[4]

Hawaii represents a unique case in that the public school system is essentially state financed, with only minor local supplementation. Delaware and North Carolina provide funds sufficient to fund minimum state-determined salaries and fringe benefits for teachers, auxiliary, and supervisory personnel, and transportation and other school costs. At the other extreme, in states such as New Hampshire and South Dakota, amounts representing a very small proportion of total school operating revenues are distributed to local school districts as so-called foundation aid, designed to provide some equalization of resources available for schools.[5]

It is tempting to generalize from the performance of New Hampshire and South Dakota and suggest that the state contribution to the financing of the public schools tends to be small where the state tax system lacks either a general sales tax or an income tax, or both (as in the now unique case of New

Hampshire). But states like Oregon, Massachusetts, and Nebraska, which levy both of these major taxes, nevertheless account for only about 20 per cent of elementary and secondary school revenues.

Alternatively one may readily observe that the average state contribution to school financing is low in New England, at 27 per cent and high in the South, at 55 per cent, and conclude that the difference may be due to differences in traditions of local autonomy. But within any one geographic region one finds very large variance in this ratio and no apparent pattern is discernible outside of New England and the South. It is not clear that the widespread use of the county as the unit forming the boundaries of school districts in the South in contrast to the much greater fragmentation of school districts in New England provides any obvious basis for explaining the difference between the two regions in this respect.

One factor that one should expect to influence the state-local division of responsibility for school financing is the existence or non-existence of property tax rate limits, and their rigidity where found. Once again, however, one may find states with stringent limits and those without limits in similar positions. For example, West Virginia, Michigan, and New York are states with stringent, less stringent, and little or no limits, in that order, and yet the state share of school revenues is, respectively, 48, 45, and 45 percent, or almost no difference at all.

Thus there is no readily apparent explanation for the variaance in the proportion of school revenues accounted for by the states.

The Nature of State Aid Programs

The form taken by state aid for elementary and secondary education currently varies widely among the states. At one extreme is the Delaware-North Carolina type of system, which provides for fixed sums per teacher and/or pupil unit. But most states employ some form of foundation program under which a minimum of revenues per child in average daily attendance or "membership" is assured to each school district that levies at least a specified property tax millage. Thus, for example, for 1969-70 in Michigan for most school districts the "gross allowance" per pupil is $408 and the "deductible millage" is 9 mills. Under this formula, provided that the district levies at least the

12 mill mandate minimum, it receives $408 per pupil less .009 times state equalized assessed value of property per pupil.[6] This type of program is equivalent to a fixed grant for all districts levying the mandated minimum qualifying millage and offers no incentive for increasing local effort. Its main objectives are equalization among districts in the amount of revenue available per pupil in membership and ensuring that some minimum amount is available to all districts. In a state such as Michigan neither of these goals is adequately achieved, because the gross allowance is far less than the sum needed to provide an adequate educational opportunity, and because the deductible millage is too low to permit substantial equalization.

A third kind of program is to be found in Wisconsin, Rhode Island, and New York. It too involves the foundation approach, but may include a substantial measure of incentive to increase local effort through a matching feature. Thus the New York program requires that the school district levy 11 mills for operations to qualify for general aid. If so qualified, the state shares in the district's approved operating expenditures per pupil of up to $760 in accordance with the aid ratio. This ratio is calculated so as to be equal to 49 per cent where the property valuation per pupil is equal to the statewide average, higher for lower value districts, up to a miximum of 90 per cent, and down to 0 for the richest districts, that is, those with double or more the state average value per pupil.[7] Such districts are protected, however, by the proviso that general operating aid may not fall below $274 per pupil for any district.

At first glance the New York program appears to meet the major objections to the more commonly used foundation program such as that found in Michigan. But operating expenditures per pupil in 1968-69 average $967, more than $200 in excess of the ceiling on the amount in which the state shares, so that inducement to greater local effort is minimal. And the equalization aspects of the plan are clearly very much blunted by the minimum per pupil aid feature.[8]

In addition to their general aid programs virtually all states also provide a wide variety of grants for specific purposes, such as pupil transportation, teacher retirement, vocational and special education, and so forth.

Clearly this is not the place in which to attempt a full scale description of the 50 state systems for aid for elementary and secondary education through which they provide their share of the cost of supplying this service in the public sector. Enough has been said, perhaps, to illustrate the variety of shapes taken by these systems and hence to provide the background for later discussion and evaluation of the role of the states in financing elementary and secondary education.

WHY LOCAL CONTROL AND FINANCE ?

Decentralization of control and financing of elementary and secondary education has been part of the American scene since the inception of our public school system. In most states, as we have seen, primary responsibility remains with local school districts while the states and, to a far lesser extent, the Federal Government provide financial assistance. The states, in varying degrees, also function in a supervisory capacity, stipulating minimum standards for such things as length of the school year, teacher certification, curricula, and so forth.

In an age of scattered settlement, poor communications, very rudimentary state governmental structure, and an economy in which a strong back was far more important as a condition of gainful employment than a trained mind, when a minimum level of literacy was the essential goal of the public schools, decentralization must have seemed self-evidently appropriate, if not inevitable and unavoidable. Moreover, the costs of supplying the limited educational services, for school years that frequently did not exceed three or four months per year, were generally well within even the limited fiscal resources of local communities. At the same time, prior to World War I, the fiscal resources employed by both the Federal Government and the states could hardly be said to be superior to the local property tax, either in revenue raising capacity or equity.

Under present circumstances, however, the case for local control of school budgets and administration and for requiring or permitting a major share of fiscal responsibility to be borne by local school districts in a highly decentralized organizational structure is certainly less than self-evident. Education is now a key factor in determining the individual's economic opportunities, it strongly influences the quality and even quantity of citizen participation in democratic processes, the vast improvement in communications leaves almost no one isolated or insulated from the mainstream of life in the nation, and the very mobility of the population makes the products of schools everywhere the potential residents of communities throughout the country. In addition, of course, the states and the Federal Government now have access to vast taxing powers not readily accessible to local units of government, and the "higher" levels of government have developed administrative capabilities unknown in the nineteenth century and earlier.

Thus it is now possible to make a plausible case for centralization of control and finance at the state, regional, or even federal level of government. Major aspects of this case will be taken up in the following section. Our task here is to delineate the reasons for retaining or perhaps strengthening and modifying the fiscal role of local decentralized school districts.

Differences in Preferences and Consumer Sovereignty

If these districts are to continue to function in anything like the way they now do, their role can only rest on the presumption, for which variance in existing practices and programs provides ample support, that not only individuals but also neighborhoods and whole communities differ widely in their tastes as well as in their perceived needs with respect to quality and quantity of elementary and secondary education. Efficiency in the allocation of resources in the public sphere of the economy requires that these differences be reflected in the budgetary process that governs the assignment of resources between public and private uses and, within the public sector, among functions and subfunctions.

The late Professor Charles M. Tiebout saw the multiplicity of local units of government, particularly within metropolitan regions, as serving precisely the function of achieving satisfaction of consumers' diverse tastes for public services generally, including those for elementary and secondary education.[9] In a world that met all of the necessary conditions for optimum efficiency in the allocation of resources[10] each "taxpayer-consumer" of the benefits of education would pay for marginal units of those benefits, *as he perceived them,* exactly what they were worth to him. But if it is assumed that education is to be supplied through the public sector we are forced to substitute voting and the budgetary process for the market place and "second-best" solutions must be sought which will leave some people with less education than they are willing and able to pay for and some with more. Presumably the democratic process operating through the institutions of representative government achieves solutions which, while less than optimal, satisfy a majority of consumer-voters.[11] Thus to the extent that majorities of different groups of people assembled within different jurisdictional boundaries exhibit variance in tastes, preferences, income, and so forth, they will wind up with differing qualities and quantities of public elementary and secondary education.

It may reasonably be assumed that the variances in tastes, preferences, and incomes is less within the thousands of school districts than it is within larger jurisdictions such as the states, and that mobility is greater among local school districts than among states. It then follows that the local voting-budgetary process will produce an allocation of resources to education that is more efficient than the outcome to be expected under a statewide centralized system.

The importance of and the weight to be attached to this conclusion depends in substantial measure on acceptance of the value judgment that it is the preferences of individuals we seek, fundamentally, to satisfy. Moreover, efficiency in the sense employed here is but one criterion. It may be offset or reinforced by such other considerations as may arise from concern about income distribution, so-called benefit spillovers to people in other jurisdictions, and economies or diseconomies of scale in the production of educational services.

Pluralism

A second major reason for assigning a large role to local school districts in the control and finance of education lies in the alleged virtues of pluralism. Clearly the risks associated with innovational experimentation are reduced under decentralization. In addition, one would expect that the likelihood of innovations emerging may be greater where there is a multiplicity of governing units than under one giant monolithic structure. It is the diversity of tastes and preferences that suggests that the more venturesome groups are more likely to be submerged in a minority at the statewide level than in a few districts or even one local district.

By the same token the costs of innovational errors may be minimized if confined to single school districts. This factor in itself, of course, can be expected to give rise to more innovation than would be forthcoming from a centralized state system.

Several hundred governing boards and administrations may or may not produce more of what is wanted in education than one very large one. But the alternative of many units seems preferable to that of the one unit if we assume that the mistakes of some of the units in a decentralized system will be avoided by the others while the successful changes will be copied or adopted.

Local Control and Local Financing

It is possible to envisage a set of arrangements for control and finance of education under which control of policy and programs may be exercised by one level of government while responsibility for finance is assumed by another "higher" level. If we faced an all-or-nothing choice this alternative would be unappealing because of the inefficiency it promises. That inefficiency relates to the fact that the budget level would be likely to be too high for some and too low for others relative to local preferences. It does not imply inefficiency within the imposed budget constraint, however, for a dollar "wasted" involves the same benefits foregone irrespective of its source.

As a matter of political reality, however, it is difficult to imagine the state providing all of the financing while permitting local school districts broad discretion in the use of the funds.

But the all-or-nothing choice is clearly unnecessarily restrictive. Local control may be modified by the state imposing certain minimum requirements on various aspects of performance and standards while permitting local districts freedom to exceed these requirements and standards. Similarly, the state may provide all or part of the costs of meeting its conditions while permitting local districts authority to levy their own taxes or charges. It is, with respect to both control and finance, the *decisions at the margins* that are relevant for efficiency considerations. Much depends, as we shall see, not so much on the level of state support or on the proportion of costs borne by the state, but on the form taken by the instruments under which funds are distributed. We need here only note that outcomes are likely to differ substantially, depending on whether funds are channeled from the state to local districts by means of lump-sum general, lump-sum specific, matching general, or matching specific grants.

What does seem clear is that the assignment of a major role in both the control and financing of elementary and secondary education to local school districts is readily justified. It is required if efficiency in terms of maximizing, under various constraints, the welfare of consumer-voter-taxpayers is accepted as a goal in the provision and financing of education.

THE FEDERAL AND STATE ROLES

A number of considerations suggesting that some part of the responsibility for financing elementary and secondary education should be assigned to the Federal Government and the states under present and foreseeable circumstances in the United States have been alluded to or implied. These and other considrations will be developed in this section.

In substantial degree efficiency in resource allocation may be in conflict with other goals, such as equality of opportunity, that may be sought through federal and state aid. But efficiency *requires* that state and national governments share fiscal responsibility with local school districts. Spatial spillovers of educational benefits, interlocal competition for industry and wealth, and the shortcomings of the property tax suggest federal-state contributions to the financing of education that can be conducive to efficiency.

Fiscal Capacity and the Equal Opportunity Objective

In the contemporary literature on education and its financing one commonly finds general acceptance of the objective of "equal educational opportunity." It is argued that, given the importance of education in modern society for the attainment by the individual of socio-economic status, we cannot permit the accident of birth in a poor or a wealthy community, or in one that places a high or a low value on education, to determine the educational opportunity available to a child. Rather, all children should be afforded the same educational opportunity.

One author recently has averred that "*The* basic purpose of all educational fiscal policy should be to put the money where the need is and if this is adequately done, equalization of educational opportunity will be in a large part accomplished."[12] He goes on to recognize that much empirical research is required in order to identify "needs" and the costs of meeting them, but the statement nevertheless remains devoid of meaningful or operational definition. We are presented with two empty boxes, one of which is labeled "need" and the other "equal educational opportunity."

One can speak meaningfully about need only if he can define the product or output in education and relate inputs of resources and their costs to quantities of that product. Then, given an objective in terms of output, it becomes possible to state need in terms of the dollars that must be spent to purchase the inputs that will produce that output. This assumes, of course, that the objective can command acceptance as a goal in the budgetary process.

And without a clear-cut definition of output in education and far more information about the nature of the production function that relates inputs to output than we now have, a definition of "educational opportunity," let alone "equal educational opportunity," is not possible. Rather, it seems that if we are to arrive at operational guidelines for financing education, given the present state of our knowledge, we should drop high-sounding slogans and resort to meaningful, operational criteria. One such criterion is that there should be made available to all children, irrespective of where they may live, a minimum level of educational resources. This minimum may be defined as that level that will permit all children to develop their skills and knowledge to the point where, at the margin, the value to them and to society of an increment in skill and knowledge is equal to the private and social costs of attaining it.[13]

Rigidly construed, without better data than seems likely to be obtainable, this criterion is probably no more functionally operational than "equal educational opportunity." If we assume that children, grouped by school district, respond alike in the learning process to exposure to inputs of educational resources, and if inputs everywhere can be purchased at the same price, then we can arbitrarily set a minimum number of dollars of operating expenditure per pupil as our objective. That minimum may be set at a level that taxpayers of richer school districts in states with relatively generous aid systems are willing to support. The appropriate figure might, for example, under cost conditions prevailing in 1970, lie in the range of $900 to $1,100.

Clearly one would not want to retain the assumptions that input prices (primarily teacher salaries) are equal everywhere and that children in all school districts respond alike to inputs of educational resources. Instead, whatever the basic minimum established for per pupil expenditures, it should be subject to adjustment for differences in prices or costs and to take account of the number of children in each district who suffer from "cultural deprivation," presumably related to the socioeconomic status of their families.

Thus, in effect, I am urging that we substitute "universal access to a minimum of educational resources" for the more grandiose, more noble, but operationally meaningless "equal opportunity" objective. Reconciling the achievement of the stated objective with efficiency through the budgetary process remains the job of the fiscal instrument or instruments through which the funds are to be provided, both locally and through federal and state aid.

Acceptance of the objective of universal access to a minimum of educational resources does not, in itself, necessarily point to a fiscal role in education for the Federal Government and the states. A further step is required. It is that we recognize that any given level of expenditure per pupil can be attained at a tax-price to the individual taxpayer that varies not only with the magnitude of his own tax base but also with the magnitude of the tax base of the school jurisdiction in which he resides.

Let us suppose that the property tax continues to be the principal or, in most instances, sole source of local school revenues. Then if $800 per pupil is to be raised locally it will take a 10 mill tax rate in a school district with $80,000 in assessed value of property per pupil and an 80 mill rate in one where the per pupil valuation is $10,000. Thus in the first school district a taxpayer owning property assessed at $20,000 would contribute $200, whereas one similarly circumstanced but living in the second district would pay $1,600. It seems obvious, other things being equal, that the willingness and ability to support the suggested minimum level of per pupil expenditures will differ widely in response to the eight-fold difference in "price" or fiscal capacity, and we should expect that those districts with low fiscal capacity will not provide educational resources at the minimum level indicated.

If resource allocation is to be efficient from the standpoint of society as a whole, the price differentials as viewed by the taxpayer must be reduced, ideally to zero. Otherwise resources that are far less productive at the margin will be used in the rich districts while resource inputs that would yield relatively large increments in benefits would not be forthcoming in poorer districts. Equity may also demand that the tax-price of a dollar used to purchase educational inputs be the same in all districts, at least up to the point at which the minimum level of resources has been provided.

Thus both efficiency and equity may be served by means of state aid that takes the form of equalizing grants that vary inversely with the district's tax base per pupil, or fiscal capacity. But there is no fundamental reason why concern with either equity or efficiency in educational finance should cease at the borders of each of the 50 states. States, too, obviously, differ in fiscal capacity, and if our objective of universal access to minimum educational resources is to apply to the nation as a whole, the reasoning that requires state aid to local school districts so that the tax-price throughout the state of achieving this objective is equal, or fiscal capacity is equalized, also requires federal grants to the states. These grants should, similarly, vary inversely with the states' fiscal capacity to support education.

The measurement of fiscal capacity to support education would be comparatively simple if circumstances governing demands upon fiscal capacity to finance public services other than education were similar in all communities.[14] But clearly this is not the case. A central city school district is subject to competition for local tax funds that differs sharply from that facing school districts in rural communities or wealthy suburbs. The obvious "solution," namely to measure fiscal capacity for education by treating it as a residual, that is, as total fiscal capacity less that part allocated to noneducational purposes, is not a solution at all. This follows from the fact that the city dweller enjoys public services that are not provided to the rural resident, and choice of city versus rural residence carries with it certain costs met through the public sector that are not necessarily appropriately subsidized by higher levels of government.

Logically, therefore, in arriving at a measure of local fiscal capacity that is to be subject to equalization, we should seek to deduct from total fiscal capacity only that part of the local tax effort that is imposed by reason of the local jurisdiction being required to finance expenditures that yield benefits that may be said to accrue to the state or the nation as a whole. Defining this part of the local tax effort necessarily will involve some arbitrary judgments. But local contributions to at least some forms of public welfare payments and to other functions, the support of which involves costs imposed by federal or state law, the openness of the city, or its role as place of residence for new, culturally disadvantaged migrants, appear to be candidates for consideration. "Municipal overburden" is the term that has come to be used in this context, and if it is defined so as to exclude the costs of providing what may be called "urban amenities," it may serve as an appropriate vehicle for the desired refinement of fiscal capacity.

Deficiencies of the Property Tax

Another reason for looking toward the states and the Federal government for support for elementary and secondary education is to be found in the inequities and adverse economic effects of the local property tax.[15] As long as this tax instrument remains virtually the only one available to local school districts, its defects and limitations argue for reliance on alternative sources available to the states and the Federal government. The employment of the property tax involves costs to society, in terms of reductions in efficiency in resource allocation and adverse distributional consequences, that should be weighed against the costs of shifting responsibility for decisions affecting allocation of resources to education from local to higher levels of government.

This is to suggest that the popular political appeal for more state aid as a means of obtaining property tax "relief" may have merit. But too little is known now about the economic effects of property taxation to permit one to offer a judgment with respect to the weight to be attached to this argument for federal and state aid to education. Conceivably other forms of local taxation would be conducive to a more rational local budgetary process, but this argument does not apply when the alternative tax instruments are employed by nonlocal jurisdictions and the proceeds distributed to local units.

Inter-Local Competition for Industry and Wealth

The smaller the taxing jurisdiction within the federal structure of government in the United States, the more susceptible it is to the loss of industry, commerce, and wealthy individuals in response to local differentials in tax levels.[16] Local school districts are likely, in some uncertain degree, to be constrained in their taxing effort by this consideration.

One function that may be served, therefore, by federal and state aid for education is to reduce or even eliminate resource misallocation in spatial terms that is produced by local tax differentials. A strongly equalizing system of aid, for example, can make it possible for all school districts to realize any given amount of revenue per pupil while levying a uniform tax rate. Such a system will eliminate as a locational factor differences in school tax rates. This may be the case even if some differentials persist, if surviving differentials are clearly reflected in superior school programs and such superiority does, in turn, attract high income people and industry at least as much as the tax differential tends to repel them.

Benefit Spillovers

Thus far our analysis has assumed implicitly that the benefits flowing from local elementary and secondary education accrue exclusively to residents of the local school district. In fact, however, educational benefits "spillover" spatially to the advantage of residents of the state and the nation as a whole.[17]

These spillovers or spatial externalities take a variety of forms. Most obviously, perhaps, they arise through migration from one locality and state to another. The youngster going to school in rural Alabama may live his adult life in Birmingham or Detroit, or the product of the public schools of Newton, Massachusetts, or New York's Westchester county suburbs may migrate to Atlanta. The quality and quantity of the child's education in one jurisdiction may, therefore, affect the magnitude of his contribution to public revenues or demand for public expenditures in another. The effectiveness of the democratic process in national and local affairs is a function of the quality of education everywhere, and the quality of the local labor force. Hence, the nature and strength of the local economy is in part a function of the quality of education offered in earlier places of residence of in-migrants. Even such matters as the probability of young men in one locality being drafted into the armed services depends on the education afforded to the total pool of young men elsewhere in the United States.[18]

Two major consequences of significance for our analysis of the roles of federal, state, and local governments in the financing of elementary and secondary education follow from the existence of spatial spillovers of education benefits. First, if it is recognized that some part of these benefits will not be appropriable locally, the voter-taxpayers of any given school district, in weighing benefits against costs will be inclined to undervalue benefits, thus approving lower levels of outlay for education than are warranted if all benefits are taken into account. This seems likely to be of importance particularly in depressed areas subject to substantial out-migration, areas in which young people, as they move elsewhere in the search for economic opportunity, will find themselves most severely handicapped by an inadequate education. Thus efficiency in the allocation of resources to education requires an offsetting inflow of funds from outside the local and state jurisdictions to balance the outflow of benefits.

Secondly, even if underallocation of resources to education does not follow from the existence of spatial spillovers, or to the extent that it does not, a question of interregional equity arises when costs are borne in one jurisdiction while benefits accrue in part elsewhere. Again, there is justification for federal and state assumption of some part of the costs of local education expenditures.

All of this is to say, simply, that there is a statewide and nationwide interest in the quality and financing of education in each of the nation's local school districts, an interest which is quite independent of values expressed in moral judgments about equality of opportunity, equal protection under federal and state constitutions, and so forth.

Responsibility for Special Students

As long as we maintain freedom of the individual to move within the nation among states and local jurisdictions as he pleases, and at the same time permit local governments to zone and plan as they please for patterns of housing development, it is inevitable that some communities will face the responsibility for the education of large numbers of culturally deprived children and others will not. Moreover, educating these children in a manner that encourages or permits their attainment of levels of achievement adequate to afford them the economic opportunity necessary for escape from poverty is bound to entail very high costs.

Simple appeal to justice suggests that these high costs ought not to be borne locally, but are the responsibility of the states and the nation as a whole.[19] In addition, of course, it is the local jurisdictions in which the largest proportions of low-income minority group children are found that are likely to be least well endowed with the resources available for the support of education.

Federal and State Leadership in Education

Much of the inspiration and impetus for innovation and improvement in education may be expected to come from local school districts. Local aspirations, however, may be less than those justified in terms of state or national interest. And few local school districts can command the resources needed for research and experimentation leading to improvement in the educational process. Thus it is from the states and the Federal government that we must look for a major leadership role. If this role is to be effective it will need funding, not only for research, but also for providing grants to local units designed to implement the introduction of new programs and methods and to raise, where appropriate, the level of local educational aspirations.

Summary of Objectives—The Role of Federal and State Governments

Before proceeding with our discussion of instruments appropriate for implementing the roles of the federal and state governments in the financing of education, it will be useful to summarize the objectives of and justification for these roles. It is clear that large amounts of money will be involved, beyond the $18 billion currently contributed by the Federal government and the states. The form and nature of the means of transferring funds to local units must be closely related to the justification for transfers if the objectives sought through these transfers are to be gained.

With approximately 46 million pupils enrolled in the public schools in 1970 the current average level of operating expenditure per pupil is about $800. Simply raising the level of expenditure to this amount in all states in which it is now less would cost some $4 billion to $4.5 billion.[20] How much more than this sum may be called for obviously depends on one's judgment as to the objectives to be sought in education and the costs of attaining them.

Our first objective is to ensure universal access to minimum educational resources, an objective that may be viewed as an operational substitute for the goal of "equal educational opportunity." Achievement of this objective at an equal or substantially equal cost to local taxpayers irrespective of their location requires major federal and state aid programs designed to equalize fiscal capacity. Recognition of the limitations and shortcomings of the property tax urges that it be supplemented and perhaps partly supplanted by superior revenue sources most readily accessible to federal and state governments. Closely related is the recognition of the constraint imposed on local tax effort by inter-local competition for industry and wealth. Spatial spillovers of educational benefits justify federal and state aid in the interests of both efficiency in resource allocation and equity. Equity, again, and considerations of feasibility require that federal and state jurisdictions contribute to the high costs of attaining educational objectives with respect to culturally deprived minority group children. And, finally, federal-state aid designed to raise local educational aspirations and/or to implement innovations and improvements in educational programs seem essential to attainment of a rate of advance in the quality of elementary and secondary education that reflects the national interest.

POLICY INSTRUMENTS

As we have seen, most states now employ a "foundation" program designed to provide some equalization among local districts and, in addition, specific grants for special purposes. Federal aid consists of a large number of programs with little coordination among them.

In general, little actual equalization is achieved. In 1967-68 in Michigan, for example, for 526 school districts per pupil current operating expenditures ranged from a low of $402 to $900-$950 for the top 5 districts.[21] Virtually all foundation programs provide basic allowances that are far below the costs of supplying the resources required. Grants effectively take the form of lump-sum transfers that tend to substitute for rather than supplement local tax effort. One study found that for each dollar of state aid, local expenditures increase by only 16 cents.[22] A more recent analysis suggests a similar conclusion.[23]

General Aid: State

If general state aid is to achieve the equalization objective, it must assume a form under which the "income effect"[24] of the lump-sum grant is supplemented by a strong "substitution effect," one that operates through its influence on the "price" per dollar of expenditure to the taxpayer-voter. This requires that the grant assume a matching form. Thus, for example, where the matching ratio is 1:1, that is, the state agrees to contribute a dollar for each dollar raised locally, the effect is to reduce the price to local taxpayers of a marginal dollar of expenditures for education to fifty cents, cutting the price of education by one-half, relative to the prices of both other public goods and services and private purchases. In the absence of this substitution effect, if the income elasticity of demand is in fact in the neighborhood of 1, substantial equalization would require that upwards of 80 per cent of expenditures for education be financed by the states. Moreover, the matching provision is required as a means of retaining a substantial measure of local budgetary discipline.

But matching at a uniform ratio for all districts is clearly not adequate to the task of equalization. Let us suppose that the principal objective of the state aid system is to ensure that all school districts that levy 20 mills[25] on the equalized value of property will have available to them $1,000 per pupil in membership. River Rouge, with $57,621 in state equalized valuation per membership pupil, the highest in Michigan, would realize $1,152 in property tax revenue per pupil plus a like amount from the state, for a total of $2,304. At the other extreme Rudyard School District, with $2,007 in equalized value per pupil (SEV) would wind up with total operating revenue per pupil of $80!

What is required is a variable ratio matching grant. Assuming the objective to be, again, a minimum of $1,000 per pupil with a levy of 20 mills, the required matching ratio for districts with $50,000 or more of SEV would be zero. River Rouge would receive no general aid from the state. At the other extreme the ratio required for Rudyard would be 24:1. That is, its levy of 20 mills would yield $40 and the state grant would be $960. The general grant aid ratio would be given by the following formula:

$$\text{Aid Ratio} = \frac{\dfrac{\$1{,}000 - .02(\text{SEV})}{.02(\text{SEV})}}{1}$$

The operation of this formula may be illustrated with reference to Michigan school districts with varying amounts of SEV as follows:

District[26]	*SEV*	*Yield Per Pupil of 20 Mills*	*Aid Ratio*	*State Aid*	*Revenue Per Pupil*
Detroit	$16,797	$336	1.98:1	$664	$1,000
Ecorse	40,011	800	.25:1	200	1,000
Garden City	7,039	141	6.09:1	859	1,000
Grosse Pointe	29,070	581	.72:1	419	1,000
Mathias Twp.	4,888	98	9.20:1	902	1,000

If all districts were prohibited from levying either more or less than 20 mills only River Rouge, with $1,152 per pupil, would realize more than $1,000 per pupil and no district would receive less. The cost to the state, on the basis of 1968-69 levels of SEV and membership pupils, would be approximately $1,460 million and the local share of operating revenue $640 million.

But given presumed differences among school districts in preferences, tastes, perceived needs, and so forth, as well as the desirability from the standpoint of efficiency in resource allocation of permitting freedom of local choice, equalization to the indicated extent seems unwarranted. My own view is that a much preferred outcome is one under which each district is given the option of choosing its own millage rate, assured that each mill that it levies will (again with the exception of districts with SEV of $50,000 or more) yield the same amount of revenue per pupil in all districts. Thus, for example, if Detroit chose to levy 25 mills it would obtain $420 per pupil in tax revenue plus $832 in state aid (1.98×$420), for a total of $1,252. The same levy in Mathias Township would also yield $1,252 per pupil. Thus what is being equalized under this system is the total dollar yield per pupil per mill in the district tax rate.

It may be objected that a district enjoying a state aid ratio of 9.20:1 would be under strong pressure to raise its tax rate in order to obtain state funds under highly favorable terms. Irrespective of the aid ratio, however, the fact remains that a home assessed at $10,000 in all districts would bear the same $10 in tax per mill. That $10 would be multiplied by 10 or more in some districts and as little as 1 or less in others, reflecting the variation among districts in the size of the local tax base available to carry the cost of education.

It may also, on the other hand, be objected that the system lacks a means of ensuring a minimum local tax effort for education. The answer to this objection is not obvious. Any mandated minimum millage reduces local discretionary choice. Limiting that choice may be viewed, however, as required by the statewide or national interest in the quality of education everywhere. Moreover, if we are to ensure the attainment of the objective of universal access to some minimum of educational resources, it would appear necessary for the states, or perhaps the Federal government, to define that minimum. Then, given that it may be obtained in all districts within a state at the same tax rate, the desired minimum can be assured by requiring that at least a minimum levy for school operations be raised in all districts.

The suggested approach is, of course, highly flexible. The basic per pupil amount, here stipulated as $1,000, is essentially equivalent to the "basic allowance" under foundation programs and may be set at any desired level. Similarly the 20-mill "standard" levy is equivalent to "deductible millage" under foundation programs and it too may be readily adjusted. The major difference between the variable matching ratio system and a foundation program with a $1,000 basic allowance and 20 mills deductible is that for purposes of the system suggested here these magnitudes are used only to establish the state aid ratio. They do not establish as under the foundation program approach, given SEV, the per pupil grant. That is a function of the aid ratio *and* the *actual* local tax rate. It is this feature that avoids the lump-sum grant nature of existing foundation programs and that may be expected to be stimulative with respect to local tax effort.

A major modification of the system is required if we are to recognize differences among school districts in factors that affect educational costs. Thus we may wish to weight the state aid ratio to take into account varying proportions of special pupils, however we may define them. Once it is agreed that certain factors are to be included, it remains only to arrive at weights which may be presumed to reflect differences in costs arising either out of the nature of the pupil population or differences in input prices.

General Aid: Federal

Essentially the same arguments for general aid that are commonly accepted with respect to the states vis-a-vis local school districts apply to the Federal government in its relationship with the states. Development of a system of variable matching grants requires only minor modification of the system suggested for state aid. A choice must be made of an appropriate measure of state fiscal capacity. This might, as has been suggested,[27] be expressed as the yield of a "representative tax system" or, alternatively and far more simple, as annual aggregate personal income received in the state.

Whatever the choice of fiscal capacity measure, federal general aid might be distributed in a manner designed to ensure each state that a given tax effort for education relative to that capacity would bring federal aid in an amount that, when added to state-local tax effort, would provide the same amount per pupil in all states.

Categorical Aid

The role of categorical aid appears to me to be properly limited to the attempt to achieve such objectives as encouragement of innovation and imaginative experimentation and to efforts to raise the level of local aspirations in educational areas deemed to be of interest to the wider community—state or nation. There is little, in my view, to be said in favor of federal or state aid aimed at selected aspects of the educational program, such as, for example, science or vocational education. To be effective categorical aid must have strong strings attached to it. Since, at the state level, authority to establish various standards or impose specific requirements generally exists, once general aid has assured local districts of adequate fiscal resources, direct administrative or legislative action may be preferable to categorical assistance.

The same, of course, cannot be said with respect to the Federal government, for it does not have supervisory authority in education over the states or their school districts. Is there, then, a stronger case here for categorical federal aid to the states? The answer, I think, is yes. But I should, nevertheless, urge that there is much to be said for a presumption in favor of general aid versus categorical aid, if only because circumstances differ so widely among the states. And when categorical aid is resorted to, the categories should be as broad as is compatible with achievement of the objectives of the program.

THE ALTERNATIVE—EXIT THE LOCAL FISCAL ROLE

"Equal educational opportunity," as we have noted, has become widely accepted as a goal of fiscal policy in education. It has been argued recently by the Advisory Commission on Intergovernmental Relations that its attainment requires "State assumption of substantially all responsibility for financing education."[28] "Substantially all" means limiting local supplementation to "not more than 10 percent of the State program."[29]

Thus the goal of equal educational opportunity, which for operational purposes presumably means equal operating expenditure per pupil, with perhaps minor variance permitted, is regarded as paramount. Actually, however, the commission does recognize "the very great importance of local policy control over schools,"[30] and it is for this reason as well as to meet "unusual financial situations" that it is willing to accept the local supplement of up to 10 percent of the state program.

The recommendation, we are told, "rests on three key premises: That local property taxpayers must be relieved of substantially all the burden of underwriting the non-Federal share of education; that State assumption of such costs is the most likely route to the provision of equal educational opportunity; and that local policymaking authority over elementary and secondary education must be retained."[31]

Reconciling the third premise with the first one, I have suggested, is impossible, and the commission does not attempt it. Furthermore, apart from noting that the share of property tax receipts going to schools has increased from about one-third in 1942 to over one-half now, no case is offered in support of the first premise taken by itself.

Essentially the same recommendation was presented to the Michigan Legislature by Governor William G. Milliken during the fall of 1969. The major difference between the governor and the commission was that Governor Milliken proposed retaining the largest part of the school property tax levy. He would impose it, however, on a uniform statewide basis. The commission, on the other hand, advocated substituting state sales and income taxation for the school portion of the property tax.

Retention of a major fiscal role for the local school district must rest on the importance one attaches to allocative efficiency, to responsiveness to differences among districts in the tastes and preferences of voter-taxpayers. There is one crucial implication of the proposal to abandon it (or almost all of it) for the sake of an undefinable "equality" that I have not found recognized by any of the advocates of the proposal. It stems from the answer to the question of where are those people to turn who strongly prefer a quality of education that is not obtainable with the funds assigned by the state? One possible answer is that they may urge that the state support education more generously everywhere. But if successful, this plea would lead to tremendous waste of resources if the residents of other districts were well satisfied with the available program. That route is unlikely to be pursued, however, because the benefits that might be gained by the dissident group would be only a small fraction of the total payoff. It would seem more likely that those who find themselves blocked in their effort to allocate more resources to education through the local public sector will seek the quality of education they want and are willing to pay for in the private sector.

The response to the uniform mediocrity, or worse, that may be expected under the proposal under review may, therefore, take the form of withdrawal of support for public schools of the strongest advocates of high quality education and a shifting of resources into the private education sector. The ultimate outcome may well be equal expenditure per pupil in the public schools, or even "equal opportunity" *in the public schools,* but less equality, however defined, in all elementary and secondary education, public and private combined. And it is the combined picture that is the relevant one, not the public schools alone. Moreover, the resulting losses must be seen not only in the suggested possible reduction, rather than increase, in equality of educational opportunity and in the possible abandonment of the cause of better public education by some much needed leaders in our communities, but also in the losses in values associated with public schools, values that relate to "socialization" of the child.

Thus, it seems clear to me that the concern for equality of educational opportunity should not be permitted to so dominate policy considerations as to lead to complete or nearly complete state centralization of the financing of primary and secondary education. The equalization goal can be attained through the kind of approach favored in this chapter, while retaining the virtues of decentralization in finance and control.

FOOTNOTES

1. See, for example, recommendations contained in *Report of the Governor's Commission on Educational Reform,* Lansing, Michigan: September 30, 1969, especially at p. 10. Governor William G. Milliken served as chairman of the commission. Among its major recommendations, later presented in the Legislature as part of a package of educational reform bills, was a uniform, statewide property tax levy in lieu of the local levy for school operations. Note also the views of such highly respected figures as James B. Conant and James E. Allen, Jr., as presented in Advisory Commission on Intergovernmental Relations, *State Aid to Local Government* (Washington, 1969), p. 50, and the recommendation of the commission itself. at p. 14.

2. National Education Association, *Estimates of School Statistics, 1969-70* (Washington, 1969), p. 35.

3. For a listing of Federal programs see U.S. Bureau of the Budget, *Special Analyses, Budget of the United States, Fiscal Year 1971* (Washington, 1970), p. 116.

4. National Education Association, p. 35.

5. For brief and inadequate descriptions of state school aid programs see U.S. Department of Commerce, Bureau of the Census, *1967 Census of Governments, Volume 6, Topical Studies Number 4, State Payments to Local Governments* (Washington, 1968), pp. 19-109. A general description of these programs may be found in Advisory Commission on Intergovernmental Relations, *State Aid to Local Government* (Washington, 1969), pp. 39-49. This study reports that "The U.S. Office of Education is sponsoring a three-year project to study, among other things, foundation program differences and to assess their effect on educational financing." *Ibid.*, p. 42.

6. An alternative available to low value districts provides for a gross allowance of $549.50 and deductible millage of 20 mills. This latter option is advantageous to all districts with state equalized valuations per pupil in membership of less than $12,864, almost $3,000 below the state average.

7. The formula is as follows:

$$\text{Aid Ratio} = 1 - \frac{\text{Value per pupil in district}}{\text{State average value per pupil}} \times .51$$

8. The New York school aid system is described in University of the State of New York, State Education Department, Bureau of Educational Finance Research, *Analysis of School Finances, New York State School Districts, 1968-69* (Albany, May, 1970).

9. Charles M. Tiebout, "A Pure Theory of Local Expenditures," *The Journal of Political Economy,* 54, 5 (October, 1956).

10. See Francis M. Bator, "The Simple Analytics of Welfare Maximization," *The American Economic Review,* XLVII, 1 (March, 1957).

11. Robin Barlow, "Efficiency Aspects of Local School Finance," *The Journal of Political Economy,* forthcoming.

12. Kern Alexander, "The Implications of the Dimensions of Educational Need for School Financing," in Roe L. Johns, Kern Alexander, and Richard Rossmiller, eds., *Dimensions of Educational Need* (Gainesville, Florida: National Educational Finance Project, 1969), p. 219.

13. Obviously this definition contains an efficiency bias. Those who are more strongly egalitarian in their value preferences may prefer an alternative that calls for the achievement of equal levels of attainment or one that suggests that all children should be afforded "as much education as they can absorb," whatever that may mean. See, for example, the goal urged by then Secretary of Health, Education, and Welfare Wilbur J. Cohen, which he stated as "the right of all Americans to as much education and training as they desire and can absorb." Wilbur J. Cohen, *Selected Pages Relating to Education from a Report to President Johnson* (Washington: Department of Health, Education, and Welfare, 1968), p. 124. Mr. Cohen's objective implies that costs are irrelevant and that the economist's concern for efficiency in resource allocation is also irrelevant.

14. For a comprehensive study of fiscal capacity in general see Ad-

visory Commission on Intergovernmental Relations, *Measures of State and Local Fiscal Capacity and Tax Effort* (Washington, 1962).

15. See Jesse Burkhead, *State and Local Taxes for Public Education* (Syracuse: Syracuse University Press, 1963), Chs. II and III; Dick Netzer, *Economies of the Property Tax*, (Washington: The Brookings Institution, 1966), especially Chs. III, IV, and VII; John F. Due, chapter X, *infra*; and Barlow.

16. A review of efforts to evaluate the influence of state and local taxes on industrial location decisions may be found in John F. Due, "Studies of State-Local Tax Influences on Location of Industry," *National Tax Journal*, 14, 2 (June, 1961). For more general theoretical treatments of the subject see Harvey E. Brazer, "The Value of Industrial Property as a Subject of Taxation," *Canadian Public Administration*, IV, 2 (June, 1961), and Charles E. McLure, Jr., "Taxation, Substitution, and Industrial Location," *Journal of Political Economy*, 78, 1 (Jan./Feb., 1970). See also Netzer, pp. 109-16.

17. The nature and extent of the benefit spillovers from primary and secondary education are examined in detail in Burton A. Weisbrod, *External Benefits of Public Education* (Princeton: Industrial Relations Section, Department of Economics, Princeton University, 1964), and Werner Z. Hirsch, Elbert W. Segelhorst, and Morton J. Marcus, *Spillover of Public Education Costs and Benefits* (Los Angeles: Institute of Government and Public Affairs, University of California, 1964).

18. In 1967, in the United States as a whole, 9.3 per cent of draftees failed to meet the mental requirements for induction into the armed services. The proportion ranged from 3 per cent or less in Iowa, Kansas, Minnesota, Montana, New Hampshire, North Dakota, Oregon, Rhode Island, South Dakota, Utah, and Washington to over 15 per cent in Alabama, D.C., Mississippi, North Carolina, and South Carolina. It was a shocking 44.9 per cent in Puerto Rico, the Virgin Islands, and the Panama Canal Zone taken together. Department of Health, Education, and Welfare, Office of Education, *Digest of Educational Statistics, 1969* (Washington: U.S. Government Printing Office, 1969), p. 11.

19. This will be recognized as the reasoning on which the provisions of Title I of the Elementary and Secondary Education Act of 1965 is based.

20. Computed from data in National Education Association, *Estimates*, and based on my own rough estimates of increases in per pupil expenditures and enrollments since 1968.

21. Michigan Department of Education, *Ranking of Michigan Public High School Districts by Selected Financial Data, 1967-68* (Lansing, December, 1968).

22. E. F. Renshaw, "A Note on the Expenditure Effect of State Aid to Education," *Journal of Political Economy*, 68, 2 (April, 1960), p. 171.

23. Gail R. Wilensky, *State Aid and Educational Opportunity* (Beverly Hills, Calif.: Sage Publications, 1970).

24. Any grant will initially increase the total resources available to the recipient jurisdiction (ignoring its residents' share of central taxes levied to finance it) in much the same way as an increase in the income of its residents. If one abstracts from the "friction" involved in the political-budgetary process, it may be assumed that either form of increase in local income will yield the same increase in public education expenditures. Thus a lump sum grant will tend to increase these expenditures in accordance with the income elasticity of demand for education expenditures. If the income elasticity of demand is equal to 1, and increase of 1 per cent in income will give rise to an increase in expenditures of the same percentage. Thus if expenditure per pupil in the absence of the grant were $500 and income per pupil were $5,000, a $50 per pupil grant (1 per cent of income) would increase expenditure per pupil by $5. One empirical estimate of the income elasticity of demand for education expenditures is .73. Harvey E. Brazer, *City Expenditures in the United States* (New York: National Bureau of Economic Research, Inc., 1959), p. 58.

25. Approximately the median levy for school operations in Michigan

for 1968-69. Michigan Education Association, *Michigan Public School Data, 1968-69* (Lansing, 1969), p. xii. State equalized valuation data used in the text are drawn from this source.

26. Ecorse is a low-income heavily industrialized suburb of Detroit, Garden City is a modest-income residential suburb, and Grosse Pointe is a high-income residential suburb, while Mathias Township is a rural district in the Upper Peninsula.

27. Advisory Commission on Intergovernmental Relations, *Measures of State and Local Fiscal Capacity and Tax Effort* (Washington, 1962), especially Chs. 3 and 4.

28. Advisory Commission on Intergovernmental Relations, *State Aid to Local Government* (Washington, 1969), p. 14.

29. *Ibid.*, p. 15.

30. *Ibid.*, p. 16.

31. *Ibid.*, p. 15.

CHAPTER 9

Taxpayer Constraints on Financing Education

JAMES M. BUCHANAN

INTRODUCTION

In 1969-70, educators having finally achieved their long-sought objective of getting the federal government deeply involved in financial support of education at all levels, somewhat suddenly and unpredictably found themselves face to face with stiffened taxpayer resistance to public spending generally and by all governments, and to educational spending in particular. The post-Sputnik era was over, and 1958-68 came more and more to look like the halcyon decade. The year 1970 was a time for stocktaking, for reassessment, for musings on what might have been.[1] Those whose personal and private well-being depended on riding the exponential growth curve in educational finance reflected on alternative courses of events. How might things have been different if only the Russians had won the moon race? What might have happened if student radicals (the new barbarians) had not disrupted the educational process? Could issues of educational policy have been more effectively divorced from racial conflict?

Such questions as these, and many more, cannot be answered. History allows only one play on the stage, and the alternatives to what was and is must remain as "might have beens." We start from where we are, and it is romantic and dangerous nonsense to neglect this elementary fact. The Russians did not win the moon race; a renewal of post-Sputnik enthusiasm for all things educational probably will not take place. Some students have disrupted, and are continuing to disrupt, orderly educational processes and at all levels. The struggle for racial equality has come to be irrevocably mixed up with the organization of education. These facts of current history cannot be swept out of mind. Any serious examination of the prospects for securing broad-based public or governmental financial support for education in the 1970s must be grounded squarely on an acknowledgment of these facts along with a critical appreciation of their possible influence on the political outcomes that may be anticipated.

The purpose of this chapter is to provide a critical evaluation of the ultimate economic constraints on educational financing that may be imposed by taxpayers' resistance which, in its turn, is translated into the decisions of the politicians who are the taxpayers' elected representatives.

THE VARYING DEFINITIONS OF EDUCATIONAL "NEED"

A useful start to the discussion is to concentrate on the definitions of the "needs" for financial support for education in the 1970s and beyond. Indeed, any study of the economics of education or of anything else begins with some consideration of the demand.

"Needs" as Defined by Professional Educators

In a complex decision-making structure where final results emerge only from an interaction of divergent groups, it is functionally appropriate that there should exist a set of advocates, an advocacy group. That is to say, some group should present the case for "needs" with little or no regard being given to the costs or the economic constraints. With educational finance, this role is taken by those who may, broadly speaking, be labeled as "professional educators." In this group, I include those who are engaged actively in the education industry, either as teachers or as administrators, along with their appointed spokesmen. Since their own personal and private interests depend directly upon the level of financial support and the rate of increase in this support over time, the projections of "needs" made by members of this group are necessarily biased upward under almost any criteria. In fact, there are few, if any, limits, that operate to constrain such projections. It becomes almost as if we ask the child, "How much candy?" and he replies, "More." Professional educators would, in one sense, be failing in their advocacy role if they did not seek almost unlimited programs. Their estimates of "need," therefore, are likely to be limited only by reasons of plausibility. By this I mean that wildly exaggerated estimates may be avoided in the anticipation that such estimates would be disregarded. Within such limits, however, we may safely predict that the "needs" for financial support advanced by the advocates will represent maximal levels for consideration in the collective decision process.

"Needs" as Targets—Human Resources Estimates

In a general setting, the estimates of educational spending requirements can include both quantity and quality elements. If, however, quality levels are either preselected or carefully defined, a direct relationship between total educational financial needs and the number of persons to be educated can be established. Given this functional relationship, along with population and age-profile projections, the human resources experts can lay down reasonable targets for total outlays over some medium-term future. For a decade, these targets may be reasonably accurate, and may be quite helpful in setting some bounds to the alternative levels of support to be considered. For example, the total spending per pupil at each grade level for, say, 1970 can be measured with some degree of accuracy. Given this data, along with projection for the age profiles over the 1970s reasonably accurate targets can be laid down which indicate the total outlays that would be required to maintain current levels of support over the decade. Adjustments for quality improvements can then be built in as supplements to these base estimates.

If this method is extended over long periods, however, major errors may be introduced. Population predictions have proven to be notoriously inaccurate in the past, and there seems little reason to think that major improvements in technique have been made. A more general flaw in this method of estimating "needs" lies in the arbitrariness with which the person-spending relationship is finally established. If current levels of support are used, this amounts to making an implicit assumption that current rates of outlay are optimal or ideal. If quality improvements are introduced to counter this bias, these become the critical ingredients in the outcome. Almost any projection can then be generated and the approach may differ only in detail from the raw estimates of the advocates.

"Needs" Constrained by Estimated Social Costs— Cost Benefit Analysis

In neither of the first two methods or procedures for defining the financial needs for public education over some future period is there any explicit incorporation of costs. To the economist, any legitimate estimate of actual spending requirements must be based on some balanced assessment of the social or public benefits to be expected from differing levels of investment or outlay followed by some comparison of these measurements with those for social costs. In a fundamental sense, the cost of spending an additional dollar on financing schools is the sacrifice of a dollar spent on financing something else. Within the public or governmental sector, more spending on schools may mean less spending on welfare. As between the private and the public sector, more spending on schools and other government services means less spending on food, clothing, shelter, and other privately produced things.

The merit of a cost-benefit approach, even its most naïve application, lies in its concentration of attention on the opportunity cost of securing any public-services benefits. Choices made to expand one service, be this education or anything else, imply choices to contract something else, and rational decision-making requires that both sides of the account be considered. As economists often say, "There is no such thing as a free lunch." The implication of cost-benefit analysis for projecting the needs for governmental outlays on education is that all "justifiable" outlays must meet the basic benefit-cost test.

Once we move beyond the basic improvement in thinking that opportunity-cost logic forces upon the potential decision-makers or their expert advisers, however, benefit-cost analysis, *per se*, becomes almost as arbitrary as the other means of projecting spending "needs." How are benefits and costs to be measured? Procedures that have been widely used contain elements that are scarcely defensible on critical examination. Costs are, for the most part, measured simply by dollar outlays. Such a procedure implies, however, that each person from whom a tax dollar is drawn is in a personal, private equilibrium as regards his "purchases" of public and private goods and services. Furthermore, the simple dollar costing procedures must assume that all spending projects within the public or governmental sector itself are adjusted to some ideal budgetary mix. Finally, and most importantly, the dollar-cost measure ignores the distributional elements that are implicit in all taxation. That is to say, benefit-cost estimates yield precisely the same results when a dollar is drawn from a tax levied on the poor and when a dollar is drawn from a tax imposed on the rich.

These, and even more troublesome issues, arise also in the measurement of benefits from spending programs. What is the "social benefit," the value to the whole group of persons in the community, of a year's education of a single child? The response of the humanist who rejects the materialistic approach of the economist does not help. The "social benefit" is neither zero nor infinite. Rational choice dictates that some measure be made, whether this be done implicitly or explicitly. Benefit-cost analysts are duty-bound to fix some limits here. Their estimates can, of course, be helpful, but only if the arbitrary elements that they contain are fully recognized by those ultimate decision-makers who use their services. One of the dangers of cost-benefit analysis lies in the false precision that is often imputed to the estimates, especially by those who are unfamiliar with the procedures employed in generating the numerical indicators.

"Needs" Defined by Political Entrepreneurs— Debate Over National Priorities

The estimates or projections of the "needs" for public educational financing made by the professional educators, by the human resource experts, or by the cost-benefit analysis represent, at best, inputs into a very complex collective decision process. Regardless of the magnitude of such estimates, their critical testing comes only when they enter into and inform collective decisions, which by their nature are *political.* We stand in danger of losing contact with reality unless the complexities of democratic politics are explicitly discussed.

At one level in this process, discussion takes the form of pronouncements by politicians about "national priorities." Major changes in governmental budgetary allocations may be suggested in such statements, based more or less accurately on the measurements fed to the politicians by the experts and the advocates. The political entrepreneur represents the advocates, and he fills an appropriate social role in doing so. He can advance arguments for particular budgetary changes more or less without reference to the larger costs and without himself expecting to be successful in his efforts. In one sense, the politician who "specializes" in a specific set of public services, like education, fills his functional role in throwing up proposals for consideration in the larger context of budget-making. This applies especially to the politician who is a member of a representative assembly, a legislature, and also to the politician who is a member of an operating unit in a bureaucracy. At this stage of discourse, we predict that many dramatic programs will be suggested, often in sharp conflict one with another. In the process, however, the politicians, and elected ones particularly, are themselves becoming better informed as to the genuine limits within which they must operate. They attempt, as best they can, to interpret the signals which indicate the general public's response to alternative budgetary allocations.

"Needs" of the Taxpayer-Beneficiary— Personal Benefits and Costs

At best, however, the politician's ability to establish new priorities depends on the public's willingness to accept them. In some ultimate and final sense, the decisions concerning that share of the nation's resources to be devoted to education are made by the citizens of the community, the same individuals who bear the costs in terms of taxes paid, their own measures of sacrificed personal outlays, and who secure the benefits of the services financed. The observed collective results, the budgets that we see, reflect the outcome of a process which is and must be anchored in the willingness of a sufficient number of private citizens to support them.

This is not to suggest that individuals carry around with them any clear and well-articulated version of their own most preferred mix between private and public outlay. The private citizen may hold only the vaguest notion as to the scale of public spending that exists, even as this is translated into his own tax costs and public service benefits. Furthermore, he may be subject to considerable persuasion by the advocates who buffet him from all sides on all issues. The tax-reducers as well as the educators may influence his thinking about levels and allocations of budgetary outlays. The personalities of the politicians may loom as more important than the issues, and even on the issues themselves, particularly well-dramatized ones may dominate the others in significance on voter evaluation.

Even when all such suggested qualifications and many more are taken into proper account, however, there is no basis for divorcing final collective outcomes from the choice-calculus of the individual citizen. His is the ultimate choice, and his basic preferences can be modified and manipulated and ignored only within relatively narrow limits. The politician who does not recognize this elementary fact will find his professional career foreshortened. And the advocate or the expert who fails to recognize the necessity of accommodating program proposals to the public's preferences is likely to become a frustrated and anguished man.

Once the *individualistic* basis for collective decisions is recognized, it becomes clear that there is no "scientific" or "expert" answer to the question as to the "needs" for public educational spending or for anything else. The final calculus must be made by the citizen, who must balance off benefits against costs as best he can when he participates variously in the political process. The estimates of the experts, no matter how carefully prepared, are only one part of the information stream that the individual assesses. He may be impressed, for example, by the experts' estimate of the social benefits of educational outlay, but his decision to vote for or against a bond issue or tax override will depend critically on how he himself perceives the benefits, private and social. The productivity of any public spending program in determining the willingness of the taxpayer to support it is inherently subjective. There is nothing objective about this relevant productivity, and, at best, attempts to measure something that is objective can help to provide surrogates for the subjective evaluations that must be made.

THE TRANSLATION OF DEMANDS INTO POLICY

Let us next examine the translation of demands into policy.

Do Governments Adjust Revenues to Needs or Needs to Revenues?

Old-fashioned public finance economists often advanced the principle that there exists a fundamental difference between the private economy of an individual or family and the public economy of a governmental unit. For the former, so they argued, income and wealth are acknowledged to constrain private spending. Demands for goods and services purchased through the marketplace are limited by, and adjusted to fit, the constraints imposed by incomes and wealth. Governments, however, were held to be in the converse position. Here, it was claimed, needs or demands assume primary importance. And these demands, once they are determined, are met by adjusting governmental revenues to the level required to finance the demands. The income or revenue constraint was not supposed to operate in the public economy, at least not to the same extent that it operates in the private economy.

Very little economic sophistication is required to see that the "principle" is wrong in both applications. For *both* the private economy of the individual or family and the public economy of the governmental unit, the adjustments between income and outgo are mutual. For the private economy, the individual can behave so as to increase income and wealth if he strongly desires to expand his purchases of goods and services. Moonlighting is a familiar occupational practice in modern America. The individual adjusts his income to his spending needs, as well as his needs to his income. The same must hold true for the governmental or political unit. Within limits, of course, governments can secure additional revenues to cover expanding needs for public outlays. But, also, governments must trim their spending to meet anticipated revenues. As in the private economy of the individual or family, the two sides of the budget are brought into some sort of balance by mutual adjustments of both, not by the unilateral or even the primary flexibility of one side or the other.

The principle that emphasized the dichotomy between the private and the public economy was based on a rather naive oversight of the individualistic basis of collective decisions in anything that can remotely be classified as democratic government. If governments were genuinely despotic, the residual setting of revenues to meet spending needs might provide a more accurate model of reality. Even in the most extreme depotism, however, the reactions of taxpayers to the budgetary allocations imposed would have to be considered by the effective decision-makers.

Are Taxpayers Active or Passive Forces in Democracy?

Oversight of the elementary fact of democratic politics may have stemmed from the implicit assumption that taxpayers are long-suffering but passive creatures—the fiscal "beasts of burden," so to speak—and that there are no effective limits to governmental revenue raising. Some of the observed behavior of taxpayers in 1969 may have shaken the faith of those who held this view. More importantly, however, the passive behavior of the taxpayers when confronted with ever increasing rates of tax should never have been interpreted as indicative of silent acquiescence. Taxpayers need not riot in the streets to demonstrate their recalcitrance at higher rates. They may be willing to express their preferences in the ballot boxes and to vote for or against politicians who most accord with those preferences. For outward expressions of taxpayer attitudes, we need only to look directly at the behavior of political entrepreneurs, those who seek public-voter support for parties or for candidates. When elected political representatives, along with those who seek to be elected, strongly resist proposals for tax-rate increases, this is evidence enough that the citizen-taxpayer is exerting his influence indirectly. The message gets through, sometimes loud and clear, and politicians who choose to ignore the signals are held to quick accounting. Whether we like its results or not, democracy works.[2]

The Pliability of Taxpayer Attitudes. To the advocate of particular patterns of public spending, the fact of ultimate taxpayer control over fiscal decisions need not be disturbing if he considers taxpayer attitudes to be flexible and subject to ready manipulation. If there should exist a predictable functional relationship between his own investment in persuasion and modified taxpayer responses, the whole problem of promoting specific programs in democratic process reduces to a simple cost-revenue calculus. In this case, one of the real costs that would have to be included in achieving expanded governmental outlay on a particular service, say, education, would be necessary investment in propaganda effectively designed to secure taxpayer support. The activities of the advocates, the pressure groups, both within and without the bureaucracy, attest to a faith in the efficacy of some such attempts at manipulating taxpayer opinions. As with advertising activity in the commercial or market sector of the economy, we should hardly expect to observe its existence if its effects were wholly absent. Taxpayer-beneficiaries of public service, just as consumers, are amenable to persuasion and much of the investment in this activity is rational from the vantage point of the group which undertakes it. As with commercial advertising, however, there are clearly some limits to the flexibility of taxpayer attitudes; taxpayers' tastes for public-governmental spending programs can be manipulated, but only to a degree.

THE FISCAL ILLUSION IN EDUCATIONAL FINANCE

Is there a fiscal illusion in the public's general attitude toward governmental spending on education at all levels? If so, what implications may be drawn about political support for such spending in the decade of the 1970s. In one sense, we might argue that some illusory elements are present in almost any program whose benefits are largely intangible and subjective. What objective measures of benefits could possibly be accepted by the public, measures that would not involve some arbitrary assignment of weights to the components of a multidimensional entity? "Education," and the benefits therefrom, probably means many different things to different persons, and it becomes impossible to distinguish illusion from reality in anyone's subjective experience. One man looks at "public education" and he sees the culmination of liberal American democracy; his neighbor looks at the same institution and sees the breakdown of our whole culture. One man's horizon allows him to think in terms of long-range benefits derived from an educated and well-trained population. Another man's time span of thought makes him consider the needs for strictly professional training in the here and now. Who is to say that some men view education under an illusion, whether this be positive or negative, while other men do not? What is the reality beneath?

These are not simple questions, and answers cannot be readily offered. Contrast may indicate some of the limits. Consider the most familiar optical illusion, the mirage in the desert. If we see water before us, we can check this out with reality and determine whether or not the lake that we apparently see exists. Once we find no water is present, we still "see" the lake, but we make the required behavioral adjustments to the optical illusion. Suppose, however, that we "see" or "think we see," tremendous social good in governmental spending on education. How can we check the reality against our predictions? There is no water that is or is not in the desert here, except in some very indirect sense. The conclusions are identical when applied in reverse. Suppose that we think there are no benefits at all from public financing of education. How can we become convinced of the opposite? There is little or no experience that can be drawn upon that is at all comparable to the physically observed result that acts to confound the optical illusion. There can never be a genuine test as to whether or not the benefits from public education contain much, some, little, or no illusion.

The Unstable Equilibrium Under Potential Illusion

To the advocates, there can be major advantages in the very intangibility of the public product or services supplied. The effective limits within which general public attitudes can be modified through efficient propaganda campaigns are wider here than they would be for products and services that are more directly observable. For the latter, the taxpayer-beneficiary can make his own direct estimate of the output of the supplying bureaucracy. He can measure benefits, and he can judge how these may change through time. William Niskanen has noted that a basic reason for widespread public concern about the United States Postal Services lies in the direct measurement of performance capabilities by the individual citizens. Other governmental services may have experienced equal if not greater reductions in efficiency when measured in any meaningful sense, but their inefficiency should not be expected to generate a public outcry. Individual users, and presumed beneficiaries, cannot directly assess the performance of a public bureau or institution that supplies services which yield intangible and long-range benefits. It follows from this that if the public is once convinced, through illusion or otherwise, that indirect benefits of a program are large, and if this attitude can be maintained over time, there need be relatively little concern over the actual level of performance standards beyond certain minimal limits.

This seems to have been roughly the situation in the governmental financing of education up until 1969. Educators were highly successful in convincing the public, rightly or wrongly, that the social benefits from governmental programs at all levels exceeded the costs and, indeed, that an accelerated growth in governmental outlays was warranted. As I have suggested, however, any projection of this state of affairs into the 1970s would be grossly naïve. Something has happened to public attitudes toward governmental financial support of education; this is also the fact of 1970 that must be acknowledged.

The advocates must recognize that there are also major disadvantages stemming from the intangibility of the product or service, disadvantages that are symmetrical with the advantages in their effects. Just as the advocates may, when and if they are successful, generate public support for outlays over and beyond normal expectations, in differing periods their opponents may succeed in securing dramatic erosion in public support. The possibly illusory nature of the benefits from the governmental financing of education makes any equilibrium growth path somewhat unstable. To an extent, this instability in basic public support may be offset by stabilizing elements in the decision-making process itself. The very complexities of democratic process insure that spending programs, once started, are rarely eliminated and are only seldom reduced in scope. Even a dramatic negative swing in public attitudes about the benefits of public educational programs could produce effects on budgets only after some time lags and, even then, these effects would probably only retard the growth of spending rather than reduce it in any absolute sense. But the main point stressed in this section is the volatility of public attitudes due to the characteristic intangibility of benefits that public educational programs provide. If illusions exist, they can be shattered and, once shattered, they are not easily restored. Once we become convinced that there is really no water in the desert, that what we see is really a mirage, we cannot on future occasions readily be convinced that what we see is real. In this respect, governmental financial support for education in the 1970s may rest quite precariously on its growth path. Larger and larger numbers of taxpayer-beneficiaries may be, rightly or wrongly, beginning to question the positive values secured from educational programs, both in total and in their particular components.

THE "TAXPAYERS' REVOLT" OF 1969 AND 1970

Features of the general shift in attitudes that are peculiar to education will be examined in a later section. Before these are discussed, however, the more general "taxpayers' revolt," which is in no way limited to educational financing, must be briefly covered. There is little question but that such a "revolt" did emerge in the late 1960s. It was recognized as such by Treasury Secretary Joseph Barr in January 1969. And old Washington hands attest to the unpredicted and accelerated demands for tax reduction and reform that swept the Congress and which culminated in the tax legislation enacted in late 1969. It would be premature to classify this expression of taxpayer discontent, reflected by the behavior of elected politicians, as any long-range and permanent shift from the stance of the mid-1960s. On the other hand, it would be equally naive to dismiss the observed changes in attitudes as temporary aberrations which can be neglected in any projection of long-term fiscal patterns. The taxpayers' revolt of 1969 and 1970 may fade away; but it may also remain as a dominating feature of the fiscal scene throughout the 1970s. It may become more rather than less intense. In any case, it will be useful to look at the "whys" of the revolt, and to explain as best we can some of its origins.

Inflation. One of the primary reasons for the apparent shift in taxpayer attitudes is the post-1965 inflation. In its attempt to expand both domestic spending programs and outlays for the Viet Nam war, the Johnson administration insured a departure from the relative price-level stability which had existed for almost a decade before 1965. The fiscal position of the federal government forced the monetary authorities, the Federal Reserve Board, to expand the monetary base sufficiently to guarantee a general rise in the level of prices in the economy. As the inflation continued over a four-year period, expectations of further price-level increases came to be built into contracts and into personal behavior patterns. This change in expectations, in its turn, made the problem of control and reversal especially difficult. Therefore, in 1969 and 1970 we witnessed continued price-level increases, long after fiscal and monetary adjustments designed to stop the inflation were introduced.

The lengthy period of substantial inflation affected the individual taxpayer in several ways. For many taxpayers (those whose incomes did not increase so fast as the level of prices in the economy), inflation meant a reduction in real income. They were made worse off, in an absolute sense, by the inflationary process. When real income is reduced, the individual tries to cut back his outlays on those goods and services that are least essential to him. In technical economics jargon, he reduces his purchases of those goods and services with the relatively high income elasticities of demand. There is some evidence to suggest that many publicly provided goods and services fall within this category. The extremely rapid increase in the relative size of the public sector of the economy over the post World War II period or rapidly increasing real income provides some support for this hypothesis. The elasticity coefficient works both ways. If the inflationary process reduced real incomes for large numbers of taxpayers, and if the income elasticity of demand for government services is relatively high, we should predict that pressures would be placed on politicians to prevent or to slow down further increases in tax rates.

This real-income effect should not be overemphasized in explaining the taxpayer revolt. Many taxpayers (those whose money incomes have kept pace with or even exceeded the rate of increase in price levels) found their real incomes improved during the inflation. For this group, the tendency would be for them to continue to demand more and more publicly provided goods and services, and these pressures may more than offset those from the disgruntled anti-tax sentiments of those who have suffered from the inflation.

There is, however, a more important effect of inflation on taxpayer attitudes, and one that influences all taxpayers in the same direction. This arises from the progressive features of the federal income tax structure. This tax is based on *money* income, and the effective rate increases as money income of an individual increases. Inflation involves general increases in prices, including wage rates and salaries along with increases in other income sources. There is no distinction made as to whether these increases in money incomes represent real or purely monetary values. The income tax rate is, however, based strictly on money income receipts. It follows that, during periods of inflation in the economy, *real* rates of income tax automatically increase. Persons find themselves required to pay higher real values in tax, even if their real incomes have remained unchanged or perhaps even have fallen. This result holds so long as there is no explicit legislative action to reduce tax rates on money incomes during the inflationary period.

An arithmetical example illustrates the point. A single person who earned a taxable income of $10,000 in 1969 paid a tax of $2,190 (exclusive of the surtax). Now let us assume that a general inflation takes place; all wages and prices double, including that of the person in question. He now earned, let us say, $20,000. His money income has increased just enough to keep his real income constant. At 1969 tax rates under the federal income tax, however, this person will now pay a tax of $6,070. His tax bill, computed in money terms has more than doubled, while his money income increased twofold. The person's real tax has been substantially increased without an increase in his real income. He pays a larger share of his real goods and services over to the government in tax than before. The arithmetical example exaggerates the magnitude of the effect because of the assumed large size of the inflationary change. The principle is, however, clear. Inflation, when combined with a progressive tax, guarantees increasing real tax burdens.

This effect has surely exerted a major influence on American taxpayers in the late 1960s and early 1970s. Inflation can safely be classified as one of the major explanatory origins of the tax revolt.

Increased Selectivity in Public Programs. A second explanatory origin of the apparent taxpayers' revolt is found in the increased selectivity of public spending programs. In the immediate post-Sputnik years, educational improvement, at all levels, became an overriding social objective. Education was implicitly acknowledged to be the key element in the maintenance of scientific, technological, and economic superiority for the United States over the Soviet Union. Economic growth became a dominant goal for national policy, and education was hailed as a critical ingredient of such growth. In retrospect, the Kennedy years, 1961-63, were characterized by an expansive mood in national policy, and many of the thresholds in educational support were breached for the first time during this period.

Fads and fashions in the adoption of national goals or objectives are no easier to explain than fads or fashions in anything else. Even before the assassination of President Kennedy, signs were evident that the growth emphasis was on the wane. The "War on Poverty," which we associate with the Johnson presidency, was already on the drawing boards in Washington in early 1963. The emergent interest in poverty, in the economic plight of the lower-income groups, represented a rather sudden and dramatic shift away from growth to a redistributionist objective. Under a national growth policy, emphasis was placed on insuring a larger and growing national product, a "larger pie," as a means of guaranteeing that all sharers increase their absolute attainments in real living standards. Under a redistributionist policy, the emphasis is placed on a more equal division of whatever pie there is, on assisting some groups in their claims to larger relative shares, independently of absolute levels. A redistributionist emphasis dominated the Johnson administration's domestic policy programs, and this seems to have remained important in the early years of Nixon's administration.

Indirectly, the shift of emphasis may have exerted considerable influence on general taxpayer attitudes toward many public spending programs, and toward educational spending in particular. Taxpayers may well agree to the imposition of additional tax levies to finance *general* or universal programs yet at the same time refuse to lend support for similar levies to finance *selective* programs. On grounds both of economic efficiency and simple equity, good arguments can be made for introducing increased selectivity in public educational as well as many public welfare programs. Differentially higher outlays are genuinely "needed" for programs in the urban centers, and the returns per dollar investment here, if measured in some ultimate "social benefit" sense, may be considerably higher than on investment in educational programs which include the suburbs on some general sharing basis. Nonetheless, all taxpayers are potential voters, and the suburban taxpayer-voter may be an advocate for increased educational spending only so long as his direct benefits are included in the package. He may strongly oppose discriminatory spending programs aimed to benefit specific groups or areas, groups beyond his direct sphere of interest.

Many of the national political leaders as well as members of the bureaucratic advocacy coalitions seem to have overlooked this feedback in their sometimes zealous efforts to shift programs away from generality and universality toward selectivity.

THE TAXPAYER AND THE EDUCATIONAL MIX

Inflation and increased selectivity in the use of public funds are two sources of the taxpayers' revolt that need not be specific to education. Inflation works to increase real tax burdens, regardless of the budgetary patterns. And increasing selectivity in choosing beneficiaries of public services will generate its own political reactions independently of the particular budget items that are chosen for this purpose. There are aspects of the taxpayer revolt or reaction that are, however, limited to public outlays on education, and these should be examined in some detail.

Changes in Preferences for Educational Spending

Inflation and increased selectivity are possible explanations for taxpayer reaction even if taxpayer preferences for public goods and services remains constant in some fundamental sense. In economics jargon, the utility or preference functions may have been unchanged. Individual tastes for public spending may not have been affected.

A simpler explanation for what seems to have occurred is that preferences or tastes have, in fact, shifted. Could it be that voters-taxpayers-beneficiaries simply do not want public spending on education, or at least further advances in such spending, so much as they did, say, in 1965? To the extent that this hypothesis holds true, the economist has no tools to apply. Normally, the economist commences analysis by postulating unchanging preference patterns. When preferences shift, he starts all over again.

With public spending on education, however, we may do somewhat better than this. We may try to isolate possible reasons for the specific shift away from support for expanded programs that seems to have occurred. Even if there had been no generalized taxpayers' revolt, we might have predicted some particularized taxpayer reactions against public education. The disruption in orderly educational processes at almost all levels has itself been sufficient to force at least some changes in preferences.

Before discussing such disruption in greater detail, an important and relevant aspect of taxpayer reaction should be noted. In democratic political structures, the reactions, the attitudes, the basic preferences, which are important in affecting political outcomes are those of median or average voters-taxpayers in the community. To insure that political responses will be forthcoming through the medium of political representatives, only the preferences of the voters-taxpayers-beneficiaries in the middle of the spectrum need to be changed. And such changes may well occur independently of any observed shift in attitudes at either end of the advocate-adversary scale. That is to say, the strong supporters of an expanded public role in education may be unaffected by observed disruptions, and indeed they may view the disruptions as signal indicators of the needs for even higher spending rates. At the adversary end of the scale, those who have opposed public outlays move into even more strident positions of opposition. These two extreme groups, however, will be relatively ineffective in modifying political results so long as the position of voters in the sometimes broad middle range of the spectrum remains unchanged. The dominant role played by the median voters normally lends stability to the workings of the democratic process, but it must also be recognized that changes in the preferences of median voters will, more or less directly, produce changes in observed political results.

Educational Institutions and Racial Equality

Any discussion of public attitudes toward governmental spending on educational services would be irresponsible if it failed to include reference to elements of racial adjustment. Whether or not things might have been different, and whether or not, in retrospect, we might now see how "better" courses of development might have been pursued, the facts are that the educational institutions of the nation, the public schools, have been placed in the critical position of advancing the cause of racial equality. As a result, pressures have been brought to bear on the public school systems, and on education, as such, which need not have found this outlet. The reactions of many members of the voting-taxpaying public to educational programs may not reflect any basic attitude toward education, *per se*, nearly so much as an attitude toward more general governmental policies in promoting racial equality. Given the forced role of the school systems in the larger social context, however, a role that professional educators did surely not choose for themselves or for their institutions, there is now no means of thwarting these more general reactions, no means of diverting the attacks onto alternative targets.

The influences in question here are, of course, most directly evident in the southern United States, but they are by no means absent in other areas of the nation. It would be grossly naïve to predict that the voter-taxpayer-politician, wherever he resides, will look on a public school system reorganized to suit either HEW officials or the federal judiciary with the same degree of favor that the system enjoyed from him prior to the imposed changes. This remains as true for Los Angeles as for Charlotte, North Carolina. Federal pressures toward integration have almost certainly eroded general support for public or governmental schooling among large segments of the population. These pressures may, of course, subside over the 1970s and taxpayers may prove to have been only temporarily disaffected. There is, however, also the prospect that taxpayers will become increasingly critical of public school systems, once their reaction thresholds have been crossed initially under the impetus of external interference on racial-mix grounds.

Disruption by Student Radicals

On traditional liberal principles it may be argued that the involvement of public education with the struggle for racial equality in America was, and is, unavoidable and that any adverse public reaction from this source is a necessary cost which must be, and should be, paid. The same cannot be said of a second major source of a general shift in taxpayer attitudes, the physical disruption of orderly educational processes in the nation's universities, colleges, and secondary schools in the late 1960s. There is no liberal excuse for the behavior of either the "new barbarians" who actively participated in the disruption or the spineless faculty and administrative personnel who failed to deal promptly and effectively with the perpetrators.

The average voter-taxpayer has the elementary common sense to reach precisely these conclusions, and he also recognizes that his only means of control, his only prospect of restoring simple order, lies in some use of the ultimate financial sanction. The voter, along with his elected political representative, may also recognize that this is a very crude, blunderbuss sort of weapon. In reacting as he does, the voter-taxpayer may not have changed in his fundamental or underlying attitudes in support of the educational process as it *might be* operated and organized. When he is asked for support, however, he is limited to supporting what he sees, not what he thinks might be. He has no effective options. The monopoly organization of public school systems effectively forestalls the competitive feedback mechanism that might, in other circumstances, operate to guarantee a more direct and more sophisticated response to consumer interest.

Spillovers—The Just and the Unjust

Economists spend much time and effort discussing "externalities," the effects of some persons' behavior on other persons' well-being that are not taken into account in ordinary business transactions. As a previous chapter has suggested, the economic rationale for public financing of education is found in the external benefits that private consumption of educational services presumably generate. In 1970, there is no better example of the reverse sort of externality, external diseconomies, or "spillover bads," than is found in the behavior of the student radicals in disrupting schools. The general public does not, unfortunately, make careful and well-informed distinctions between those schools and systems where reasonable order has been maintained and those schools and systems which have been plagued by continuing barbaric onslaughts. To the average voter, the disruption of schooling that he sees on his television screen—the screaming obscenities of a mob's leaders, the broken windows and smashed doors, the filth of a post-occupied administration building, aftereffects of a bomb—depict the state of public education generally, or at least to some degree. *All* public school systems lose support when *any* school is desecrated. The hard-pressed but courageous school administrator and faculty member who succeed in resisting militant pressures suffer along with irresponsible colleagues who condone and even encourage the radicals. Just as the disruption at Berkeley reduces the financial support for all universities and colleges in the nation, the disruption at Madison reduces taxpayer willingness to support Wisconsin's lower as well as its higher schools.

The Transmission of Values—The Treason of the Intellectuals?

The school systems' role in the racial struggle and the vulnerability of educational institutions to the vandalism of the "new barbarians" are two important sources of taxpayer discontent with public education. Even were these wholly absent, however, there are reasons for suggesting that some discontent would be surfacing in the early 1970s. Related to, but not necessarily a vital part of, the barbarian attacks is a widely heralded drive to make modern education more relevant to the current ills alleged to be plaguing modern society. Many educators have applauded this objective, and many of them seek actively to shift the educational process so that it can play a greater role in social reform. In this vision, the school is to become, and should become, an institution for changing social values, for transforming the culture of America.

It must of course be acknowledged that the educational process does, and always has operated in this manner to a degree. Persons who undergo educational experience find their own values modified in the process. Nonetheless, it must also be acknowledged that this is accomplished more or less as a byproduct of the educational system's more specific, and more defensible, role in society. This role is one of transmitting to the young the set of values that are broadly accepted by the society at large. Ideally, education provides the young person with some critical appreciation of his cultural heritage. To the extent that it does not do this, education fails in a significant socially meaningful sense of the term.

This is not the place to discuss at length the pros and cons of the many complex issues raised by the value-transmission role of education. My point here is merely to suggest that the conversion of schools systems into launching pads for social reform or revolution conflicts sharply with the value-transmission role. To the extent that the public, the voter-taxpayer and his political representative, accepts the value-transmission function of education to be paramount in justifying public or governmental financial support, it will react negatively to any major shifts in program content away from this and toward social transformation. Under this hypothesis, we should predict some erosion of general support, and notably for higher education, as and if the impetus for social-reform educational programs accelerates.

Is it not now reasonable for the taxpayer of California to ask himself: Do my tax dollars which finance the University of California produce "public good"? Is it not possible that they produce "public bad" instead? If school systems, and university-college systems in particular, come to be viewed as the seedbeds of revolution by the average citizen, there is no uncertainty about the personal answers that will be given to such subjective questions.

In 1970, large numbers of individuals, in all walks of life, think that Julian Benda's prophecies were correct. They think that the intellectuals, as a class, have proved to be traitors to the culture that nourished them. Whether or not these attitudes are reasonable is not my concern here. The existence of such attitudes is fact. And this will influence the political future, which includes public outlays on schooling as well as everything else. To ignore this fact, along with the several others that I have noted, because they may not be pleasant to think about, is to adopt the educationist's own version of romantic nonsense.

CONCLUSIONS AND PROJECTIONS

This chapter has emphasized the role of the taxpayer in imposing his own economic constraints on the public or governmental support for educational financing in the 1970s. Any discussion of the basic economics of educational finance remains seriously incomplete without some explicit acknowledgment of the importance of the taxpayer's place in the whole scheme of things. I have not intended to suggest, either directly or indirectly, that attempts to measure and project the "needs," "benefits," and "costs" of alternative educational programs independently of taxpayer reactions are not productive in themselves. Such studies provide useful and necessary informational inputs in the complex decision-making that finally produces budgetary outcomes. My attention has been focused on those aspects of this decision-making that are beyond the provision of such informational inputs.

The taxpayer is passive only within limits, and governments must adjust their spending needs, for education as well as other services, to the revenues that taxpayer willingness allows. Taxpayer attitudes are subject to some manipulation, and investment in persuasion is profitable in the public economy as it is in the private economy. The very intangibility of the benefits produced by public services of many varieties, including education, makes swings in taxpayer attitudes wider than they would be for services that individuals can measure more directly. There may remain illusory elements in taxpayer evaluations of public education, and these may lend volatility to public reaction patterns.

The United States experienced a genuine "taxpayers' revolt" in the late 1960s and the early 1970s and several reasons can be adduced for this. Inflation was surely important, along with attempts to introduce greater selectivity in spending programs. More specifically, however, the erosion of public support for educational programs took place because of a basic shift in the tastes or preferences of the median or average voter-taxpayer. This shift may be explained by several factors, including the direct interrelationship between racial strife and educational process, the disruptive behavior of the student radicals, and the observed efforts to convert schools into centers for social reform.

The erosion of taxpayer support for public education may be predicted to continue into the decade of the 1970s. This erosion may be stopped, and voter-taxpayer-politician support again restored to its growth path of the 1960s, if four specific steps are taken, or if external events occur which allow the educational system to be in the position it would be in if the steps were to be taken. These requirements are summarized below. These may be taken either as necessary conditions for any general restoration of taxpayer acquiescence in accelerating rates of public outlay on education or as limited instrumental recommendations for policy on the part of those who are the advocates of such enhanced rates of outlay. In setting out these steps, I should emphasize that they *do not* constitute my own personal recommendations to decision-makers. My professional role as an economist does not extend to the intrusion of my own personal value judgments. There will surely exist widespread disagreement concerning the advisability of taking such steps when the whole set of social variables are included in any comprehensive decision and evaluation process. This applies notably to Steps 2 and 3 in the listing. For many reasons, only a few of which are mentioned in this paper, the taking of these steps may be strongly opposed. This does not, in any way, however, preclude their being listed here in the strictly instrumental sense that I intend for them. They remain steps which are required *if* general taxpayer support for public education is to be enhanced.

First in outline form, the required steps are:

1. The restoration and maintenance of order in the educational process at all levels and in all jurisdictions.
2. The separation, to the extent that is practicable, of the process of providing education from the struggle for the achievement of racial equality.

3. The restoration of universality or generality in public educational programs, or, at the least, the preservation of the universality that presently exists.

4. Preservation of the school system's traditional functional role as the value-transmission agency in society.

Each of these steps may be discussed briefly. There is no need to examine the first requirement in any detail. The voter-taxpayer-politician will not, and should not, continue to finance disorder in school systems for whatever reason. The possible inability and incapacity of the school administrators and faculties to control disruption will not remove them from the responsibility that is theirs in the eyes of the citizens.

Control over the second variable may be largely, but not entirely, outside of the hands of the professional academicians and educators. However, if this requirement is to be interpreted as a norm for the behavior of such persons, it means that they should resist attempts to make school systems the primary agencies for progress in race relations. At the very least, they should not use school systems as means of going beyond the limits suggested by external pressures. This behavioral norm is, of course, based on the assumption that the overriding criterion is general taxpayer support. If the professional educators are willing to trade off reduced public financing in exchange for the school system's playing of a more central role, this is an exchange that should be explicitly recognized in their planning behavior.

The third step will prove more acceptable to traditions within the educational community. The recent impetus toward introducing greater selectivity in public programs is grounded on considerations of economic efficiency and equity. These arguments have been considered, however, in neglect of the possible feedbacks that can be predicted to emerge once wholesale departures from universality take place. The instincts of the public school advocates in this respect are those which are consistent with self-preservation. Generalized taxpayer support for public schools requires that the benefits be made available universally to all members of the community and on some reasonably equal basis.

The fourth step is the most difficult to discuss briefly, but may ultimately prove the most important of the lot. The United States is less than two centuries old, and its cultural heritage has never been well defined. Up until World War II, religious as well as the educational institutions supplemented the family in transmitting civilized values from one generation to the next. In 1970, the failure of all three of these institutions to serve this role is widely acknowledged. But what can the historical experience of a society be when no such institutional role exists? The future cannot even be dimly seen here, and only the optimist can predict the emergence of corrective forces as a natural course of events. The school system of the 1970s may be transformed into a network of revolutionary activity; if educators allow this to take place, they can expect to lose general public support and rapidly. Conversely, the school system can readily be converted into a doctrinaire bastion of reactionary resistance to new ideas at all levels. This, too, must be resisted, despite its prospects of offering an easy means of securing support. Perhaps the 1970s are to be the critical testing times for American education; it must walk the tightrope between revolution and reaction. The scholar's freedom to examine all ideas critically and without fear must be preserved; but the scholar must also be required to accept the responsibility to work within the social structure of which he forms a part.

Mutual respect, tolerance, reason, and a sense of man's own limitations — these, as always, are the qualities that characterize an open society. These are universal values that the educational process must embody. Unless it does so, educational institutions will not get, or deserve, the public's support.

FOOTNOTES

1. The evidence for these statements is familiar to anyone who keeps abreast of current events. School bond issues and tax referenda were less successful in 1969 and 1970 than in earlier years. As a single, but dramatic, example, on 17 March 1970, voters in Los Angeles, the nation's second largest school district, rejected a school-related tax increment by almost a four-to-one margin (*New York Times*, 19 March 1970).

2. The experts of the Tax Foundation characterized 1970 as a year in which state politicians' most common theme was the promise of no new taxes. See Tax Foundation, "The Tax Review (March 1970).

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CHAPTER 10

Alternative Tax Sources For Education

JOHN F. DUE

Almost certainly additional funds will be required for the financing of education in the coming decade. At the same time education must compete with other growing activities of government as, for example, control of air and water pollution and elimination of poverty, which are likely to receive high priority. It is the purpose of this chapter to consider various alternative sources for additional funds and possible improvement in present sources that will make them more acceptable.

While consideration will be given to the relative effectiveness of different taxes at various levels of government, the chapter will not be concerned specifically with the appropriate relative role of various levels of government in financing education, in view of the coverage of this question in another chapter.

SUMMARY OF CRITERIA FOR EVALUATION OF TAXES

Several criteria have come to be generally accepted for use in evaluating tax structures. These criteria are not derived by scientific analysis, but merely reflect widespread popular attitudes, in conformity with generally accepted objectives of contemporary society. While consensus on the criteria is strong, interpretations of their meaning in particular circumstances vary widely.

Economic Distortions

A major criterion is the establishment of tax structures in such a fashion as to minimize distorting effects upon the functioning of the economy—that is, effects that cause persons to alter economic behavior in a fashion contrary to the objectives of the society. Such alterations in behavior result in "excess burdens"—in the sense of reduced real income of society not offset by governmental output.

Distortions take several forms. Taxes may reduce the output of some commodities relative to others and cause a loss in satisfaction on the part of those persons with high preferences for the goods whose relative output is reduced. Deliberate changes, sought, for example because excessive use of the product (e.g., liquor) causes losses for society, may be defended. It is the unintended type of change that reduces economic well being of the society. Secondly, taxes may interfere with efficiency in the conduct of production and physical distribution of goods, by altering decisions about the selection of methods of organization and operation utilized. If taxes cause a firm to use a method of production other than the most efficient, output from given resources is reduced below the potential level and society suffers a loss; total real income is less than the potential.

A specific type of distortion important in the sphere of state and local taxation involves decisions relative to location. Tax differentials among areas may cause firms to select locations other than those that are optimal from the standpoint of efficiency.

A further type of distortion is interference, in an undesired fashion, with decisions about work; taxes may cause some persons to drop out of the labor market or seek to work fewer hours. Similar considerations apply to owners of other resources used in production and particularly the willingness to undertake risk. If taxes reduce the willingness of persons to work, to accept more responsible positions, to gain education necessary for professional work, or take risk, society suffers a loss in the form of reduced output.

Finally, distortions that reduce the rate of economic growth are regarded as objectionable. Not only do distortions reduce the extent to which the economy attains the goals of society, but they also reduce governmental revenue from a given tax structure and require higher overall tax rates. Any tax that causes persons to change behavior to escape it will produce less revenue than could be obtained from the given tax rates if behavior were not altered.

Equity

Taxes are compulsory payments imposed upon individuals by government to distribute the costs of governmental activities among the various members of society. The rule that governmental costs be distributed in a fashion regarded by contemporary society as equitable is generally accepted. What constitutes equity, however, is strictly a value judgment and there are wide differences of opinion. Usually equity is considered to require:

a. Equal treatment of equals. Persons regarded as being in the same relevant circumstances should be taxed the same amount.

b. Distribution of the overall tax burden on the basis of ability to pay, as measured by income, by wealth, by consumption.

c. Exclusion from tax of persons in the lowest income groups, on the grounds that they have no taxpaying capacity.

d. A progressive overall distribution of tax relative to income, on the basis that tax capacity rises more rapidly than income. This requirement is less generally accepted than the others. There is general agreement that the structure should be at least proportional to income.

Unless a tax structure meets to an acceptable degree the current attitudes on equity, it will not attain general tolerance. If many persons regard a particular tax as inequitable, there will be continuous complaint and political pressure to modify the structure.

Compliance and Administration

Attainment of the objectives of society requires that taxes be collectable to a high degree of effectiveness with minimum real costs (money and nuisance) to the taxpayers and reasonable cost to the government for collection. Inability to enforce a tax effectively at tolerable costs will cause loss of both revenue and equity. If some persons are meeting their liabilities while others are not, discrimination results and economic distortion will arise from the efforts of others to escape tax. Easy compliance is important if taxpayers are to accept the tax and to meet their obligations, with minimum use of resources for the purpose.

Revenue Elasticity

Governmental expenditures tend to rise at least in proportion to national income even if programs are not increased. If tax revenues do not keep pace at given tax rates, constant rate changes are required. Experience suggests that legislative bodies are slow to make these changes and the changes may have disruptive effects on the economy. As a consequence revenues tend to lag behind expenditures.

These criteria serve as the basis for evaluation of the various major sources for the financing of education.

THE PROPERTY TAX

The traditional support for the financing of education and other local government activities in the United States has been the property tax. In the 1969 fiscal year, local governments received about $30 billion or 86 percent of their tax revenue from the property tax despite expansion of local nonproperty taxes in recent years, and the school districts received 99 percent of their tax revenue from this source. Property tax yields expressed as a percentage of GNP have remained roughly constant in the last decade at about 3.4 percent. Current percentages are about the same as they were throughout the period 1870-1914.[1]

The property tax applies to a variety of types of property, but to an increasing extent to real property.[2] Currently, about 44 percent of the tax is collected from households in the form of tax on real property and some personal property, about 43 percent from nonfarm business property, about 9 percent from farm property, and the remainder from miscellaneous types.[3] The portion on business property is in part shifted forward through price increases to the consumers of the products, and a portion of the tax on farm property may be shifted in the same fashion.

General Evaluation

The dominance of the property tax in local finance is a product primarily of the limited potential of other local tax revenues. School districts usually have no other taxing powers and those of other local units are severely limited. As subsequently explained, even if the local governments had broader powers, there would be significant administrative and economic obstacles to collecting large sums of money from these other sources. Most property cannot escape from local jurisdictions and can be discovered by local authorities—to a greater extent than other tax bases. In part, admittedly, the dominance of the property tax is a matter of tradition rather than necessity. Local governments were given the power to levy the tax when income and sales taxes were virtually unknown. They came to rely highly on them; other levels of government came to dominate sales and income tax fields.

In addition to revenue productivity, there are certain specific advantages to the property tax. Some local government expenditures directly benefit property owners and thus the taxes are regarded in part as a form of user charge. This reasoning, however, does not apply to education. A portion of the tax rests upon land, in a sense an ideal base for taxation since the supply is fixed and since landowners benefit from economic growth whether they make a contribution to it or not. A large portion of the tax rests upon business property. Business taxation is always politically popular, even if it has little support on more rational grounds. This is particularly true with large corporate holdings whose stockholders live outside the taxing jurisdiction. Especially in earlier years of the country's development, ownership or rental of expensive homes was a reasonably good measure of taxpaying ability not then reached directly by income taxation.

The property tax, however, suffers from several inherent limitations which restrict its ability to finance additional expenditures for education or other local activities. These limitations are reflected in part in political resistance to further property tax increases. Even without this political reaction, there are significant economic and equity considerations that dictate restrictions on increases in the tax.

Economic Effects

It is difficult to quantify the economic effects of the property tax. But studies suggest three areas in which there is almost certain to be some adverse effects, one of which is related to the most pressing current economic and social problems of the nation. In the first place, the tax constitutes a very heavy "excise" tax on housing. Nearly half of the tax rests directly upon housing facilities and is for the most part borne by those owning or renting the facilities. While the precise elasticity of demand for housing is not known, it is certainly not zero and the property tax inevitably creates excess burden by deterring expenditures on improving housing. From the viewpoint of social policy, it may be argued that this is a particularly undesirable consequence: that modern society is relatively short of quality housing compared to other goods.

Much more serious—given the concerns of contemporary society—is the adverse effect the property tax has upon rehabilitation of the deteriorating central city portions of metropolitan areas. Part of the impact is direct and immediate. If property is improved by replacing slum dwellings or old store buildings by modern facilities, the property tax may rise so drastically as to render the change unprofitable. But also important is the common tax differential pattern in metropolitan areas: the tax rates in the central city are often higher than those in portions of the surrounding areas.[4] Thus investors have incentive to locate outside the central city—whether for apartment or office buildings, industrial or other developments—instead of in the older areas. Therefore the depressed areas become more depressed.

Apart from the central city, property tax differentials can affect other location decisions within metropolitan areas—although they are unlikely to have much effect on decisions among widely dispersed locations.[5] Since other locational factors may be comparable within a metropolitan area, property tax rate differentials may be the key element in the decision. Particularly attractive are "industrial enclaves"—cities with a large industrial property base and few people to serve and few children to educate. Vernon in Los Angeles county and Emeryville in the San Francisco-Oakland area are classic examples.

Finally, the property tax places a relatively heavier burden, per dollar of sales, on industries that use disproportionate amounts of real property relative to total sales. To the extent that the tax reflects higher costs of local government for which the particular industries are responsible (e.g., fire protection) the differential burden may be regarded as warranted. But for financing education the differential is not acceptable, relative to most efficient use of resources. Netzer in his recent study of the property tax concludes that of all industries the railroads are most seriously affected by the property tax because their ability to compete with motor transport, not subject to equivalent burdens, is reduced.[6]

Equity

On several counts the property tax fails to meet accepted standards of equity:

1. *Unequal Treatment of Equals.* Because of uneven assessment, lack of uniformity of valuation results in different tax burdens on persons owning equivalent amounts of property. Innumerable studies have shown the dispersion in assessments, even when efforts are made by assessors to do a careful job.[7] The difficulty is in part inherent in the tax. Other levies are imposed on flows—on income or sales. Since the property tax is imposed on the value as of a particular time, constructive valuation is required. This is not difficult with some property but is very troublesome with others. In addition, as is well known, the approach to assessment has often been unscientific. This defect can be corrected, but the inherent difficulty of the task will remain.
2. *Inequity from Varying Ratios of Taxable Property to Total Wealth and Total Income.* Income is typically regarded as the best measure of taxable capacity, and total net wealth as a secondary acceptable measure. But the property tax is not closely correlated with either. The portion of the property tax on homes distributes the tax burden on the basis of the gross value of one particular kind of property. Since there is a wide dispersion in ratios of such property to income or net wealth, there is substantial departure from accepted criteria of equity. Specifically, the tax places a disproportionate burden on persons owning their homes but having little current income, and on those having relatively high portions of their total wealth in taxable form. The effect is a severe burden on older persons owning their homes, on families with incomes temporarily reduced, and on persons who prefer to spend relatively high percentages of their incomes on housing.

Much of the remainder of the tax has direct impact on business property. There will be a tendency for this to shift forward to the consumers of the products—but in uneven fashion since the ratio of tax to selling prices will vary. Any firm having high property tax relative to sales volume will find complete shifting impossible and the owners will bear a portion of the cost for a time. Farmers selling in perfectly competitive markets will be unable to shift until market supply falls in response to the higher cost and presumably cannot shift tax on land at all. The distributional pattern of the shifted portion is similar to that of a sales tax, but with uneven burden on various goods arising from the varying ratios of real property to sales in different lines of production. Thus persons with relatively strong preferences for high-tax goods will bear disproportionate amounts of the overall tax burden.

3. *Regressive Distribution of Burden.* The property tax is usually characterized as highly regressive relative to income. The question has been studied extensively in recent years and the evidence is by no means clear cut.[8] Part of the regressivity has been attributed to the tendency to assess less valuable property closer to full value than more valuable property. On this question the evidence is conflicting. The tendency appears in some areas but not in others.[9] The second source is the tendency of housing expenditures to rise less rapidly than income. Because of this tendency, the lowest income groups, homeowners or tenants, pay much more in property taxes as a percentage of income than do persons in the highest income groups.[10] But, apart from the lowest groups, the tendency is by no means general. Nevertheless the heavy absolute burden on the lowest income groups is a significant limitation to the tax on equity grounds—in addition to the wide dispersion noted in the preceding section.

Revenue Elasticity

The elasticity of property tax revenue at a given tax rate is dependent upon (1) the relationship of increases in property values to increases in national income, and (2) the relationship of changes in assessed values to changes in sales values. The former relationship is undoubtedly high although uneven. The behavior of assessed valuation is controlled by the reassessment patterns. Unlike other taxes, the base does not rise automatically with expansion of business activity, since increase depends upon action by assessors. The time lag is often very substantial, particularly in states in which actual reappraisal takes place at intervals as long as 10 years or more. The behavior of actual property tax yields in recent years relative to national income has not been bad; Netzer concludes that a .8 relationship is a reasonable estimate.[11] That is, if national income rises 1 percent, property tax revenues rise .8 percent. But this record is not nearly as good as that of other major taxes, and in some areas the record has been poor.

Reforms

Endless suggestions for changes in the property tax have been made. Further improvements in administration—particularly in the use of professional techniques of assessment—can reduce inequity and increase potential yield. More far reaching changes, such as exemption of property of low income groups and of various types of new construction involving rehabilitation or urban areas, can make the tax somewhat more tolerable. But these changes reduce the revenue obtainable. The property tax is certain to continue to play a major role in the financing of education. But it does not offer potentialities for significant increases in revenue. The objectionable features are sufficiently serious that the case for increased use is difficult to defend. The objections voiced by many groups make continued increases progressively more difficult politically. Other fields of taxation offer much greater potentiality for additional revenue for education.

THE SALES TAX

While sales taxes are not used directly by school districts, with minor exceptions, the sales tax has indirectly become a major source of funds for the financing of education through state grants to school districts and offers potential for still greater support.

Present Use

As of July 1, 1970, the sales tax is employed by 45 states containing 98 percent of the population of the United States and is used extensively by the local governments in a forty-sixth, Alaska (Table 10-1). In only four states, Montana, New Hamp-

TABLE 10-1
STATE SALES TAXATION, JULY 1, 1970

State	*State Sales Tax Rate* (%)	*Sales Tax Revenue as % of Total State Tax Revenue,* 1969	*Sales Tax Revenue as % of Personal Income,* 1969	*Food exemption*
Alabama	4	34.3	2.4	
Arizona	3	35.9	2.9	
Arkansas	3	32.7	2.2	
California	4	32.1	2.2	X
Colorado	3	30.2	1.8	
Connecticut	5	32.2	1.4	X
Florida	4	45.2	2.9	X
Georgia	3	37.2	2.4	
Hawaii	4	47.4	5.1	
Idaho	3	25.5	2.0	
Illinois	4	51.4	2.3	
Indiana	2	22.6	1.2	
Iowa	3	35.1	2.3	
Kansas	3	35.7	1.8	
Kentucky	5	37.8	2.9	
Louisiana	2	20.6	1.6	
Maine	5	44.5	2.6	X
Maryland	4	17.7	1.2	X
Massachusetts	3	12.8	.8	X
Michigan	4	35.3	2.5	
Minnesota	3	19.0	1.4	X
Mississippi	5	43.3	3.6	
Missouri	3	41.6	2.0	
Nebraska	2.5	32.4	1.5	
Nevada	3	35.2	2.5	
New Jersey	5	22.4	1.0	X
New Mexico	4	34.8	3.1	
New York	3	13.1	.9	X
North Carolina	3	23.7	1.8	
North Dakota	4	33.8	2.1	
Ohio	4	40.3	1.7	X
Oklahoma	2	18.4	1.2	
Pennsylvania	6	39.3	2.2	X
Rhode Island	5	36.3	2.2	X
South Carolina	4	29.6	2.2	
South Dakota	4	37.8	1.8	
Tennessee	3	35.4	2.2	
Texas	3.25	25.8	1.3	X
Utah	4	32.1	2.3	
Vermont[1]	3	——	—	X
Virginia	3	20.0	1.3	
Washington[1]	4.5	43.2	3.5	
West Virginia[2]	3	19.5	1.5	
Wisconsin	4	10.7	.8	X
Wyoming	3	37.9	3.0	

[1] Not in operation 1969.

[2] Excluding gross receipts tax.

Source of revenue data: U.S. Bureau of the Census, *State Tax Collections in 1969*.

shire, Delaware, and Oregon, three of which have population less than a million, is the sales tax not employed. The sales tax yields about 30 percent of total state tax reveune and about 4 percent of local government tax revenue (1969 fiscal year). The states collected $12.3 billion from sales taxes in 1969, the local governments $1.2 billion.

In that year the sales tax yielded over half the tax revenue of Illinois,[12] and, including gross receipts taxes, of Washington and West Virginia. In eight states the yield exceeded 40 percent of state tax revenue. On the other hand, the tax yielded less than 15 percent in three (Massachusetts, New York, and Wisconsin). The tax collections ranged downward from 5.1 percent of total personal income in Hawaii to .8 percent in Wisconsin.

Summarization of the use of the tax at the local level, usually city and/or county, is more difficult. Roughly, the picture is as follows (1970):

1. In seven states the municipal tax is universal or almost so (in terms of population) and is state collected: California, Illinois, Oklahoma, Tennessee, Texas, Utah, and Virginia. Most of these use 1 percent rates. A universal mandatory county tax in Nevada is regarded as a state levy.
2. In Alaska, with no state levy, the tax is widely used at the local level, with rates as high as 5 percent. In five states local sales taxes are widespread but less universal, with purely local collection (Arizona, Louisiana), partly state, partly local (Alabama, Colorado), or, in one (New York) entirely state. The rates are less uniform; figures range from 1 percent to 3 percent.
3. Limited use of the tax is made in ten states, in a few of these in only one local jurisdiction. Collection may be state (Arkansas, Missouri, Nevada, New Mexico, North Carolina, Nebraska, Ohio, South Dakota, Washington) or local (Minnesota). The local taxes differ in one very important respect. In some states, such as Illinois, liability for tax depends upon location of the vendor; in others liability is determined by place of delivery and thus typically place of residence on delivery sales.

The median state sales tax rate is 3 percent with range from 2 percent in three states to 6 percent in Pennsylvania. The median will almost certainly become 4 percent in the next few years. Fifteen states have figures of 4 or 5 percent and six have 5 percent figures. If the maximum local rates are added to the state rates, the range is changed only slightly (high of 6.5 percent) but the median is now 4 percent with 6 percent in three and 5 percent in ten. The thirteen states with rates of 5 percent to 6 percent contain 40 percent of the population of the country.

The exemptions vary somewhat among the states. Fifteen states, primarily ones introducing the tax since 1948, exempt all food, and North Dakota exempts limited categories. Many exempt prescription drugs. Six states provide credit against income tax liability for sales tax paid on prescribed minimum necessary expenditures, and a seventh (Idaho) does to a restricted extent.

Evaluation—Equity

Despite the importance that sales taxes now play in state-local tax structures, virtually never have they been introduced as measures to reform the structures; they have been established as emergency financial measures, to meet expenditure needs in the face of lagging yields from other taxes. The reluctance of legislators to enact them or voters to approve them, coupled with their tendency to remain once they have been introduced, suggest that there are significant arguments on both sides.

Sales taxes may meet equity requirements more satisfactorily then property taxes. Under the assumption that they are shifted forward, they are distributed in relation to consumer spending on taxed goods, rather than to outlay on housing, and thus on a much broader and presumably more equitable base. Nevertheless, most of the opposition to them has been based on equity grounds. First, if they apply to all goods they place a substantial absolute burden on the lowest income groups, ones that may be considered to have no tax capacity. Second, the overall distribution of burden tends to be regressive relative to income, if all goods are taxed. This has been demonstrated empirically a number of times.[13] Expenditures on nontaxable services and savings tend to rise as a percentage of income as income rises, and therefore expenditures on taxable goods tend to fall. Third, the tax affects various families in a somewhat haphazard way, placing a heavier burden on those families whose circumstances (such as number of children) compel them to spend relatively high percentages of their incomes. Likewise, no adjustment of tax burden on the basis of circumstances affecting taxpaying ability (e.g., heavy medical expenses) is possible.

The first two basic defects, and, in large measure, the third as well, can be eliminated much more easily than equivalent ones of the property tax. One alternative, the most widely used, is the exemption of food from the base of the sales tax. Much of the burden (but not all) is removed from the lowest income groups, which concentrate their expenditures very heavily for food, and the tax is, according to various empirical studies, made more or less proportional instead of regressive.[14] Much of the penalty on large families is removed. Food exemption, however, suffers from several defects, and an alternative approach, the provision of a credit against income tax liability for sales tax paid on minimum necessary purchases, is a much more satisfactory solution, as discussed below.

With this type of adjustment, the sales tax may be regarded as reasonably in accord with usually accepted standards of equity. It cannot effectively be made progressive, however. Accordingly, under the assumption that progression is desired in the tax structure as a whole, the role of the sales tax must be restricted relative to that of income taxation.

Economic Distortions

The most significant potential distortions of state and local sales taxes are those upon location, especially of retailing. With rates of any magnitude, shoppers have an incentive to shop in a low tax area, and shopping centers and other large store developments have incentive to locate in the low tax areas. How important these effects are is difficult to assess. Since stores must be located close to their customers, the effect is only on the precise site within a metropolitan area, and local sales taxes therefore offer much greater potential hazard than do state sales taxes. The danger from the state levies has become less serious as the levies have spread, since now the opportunity to buy tax free over-the-counter is limited to a very few areas. With many purchases it is not worthwhile to have the goods shipped across a state line to escape tax.

Empirical studies in recent years have concluded that there are measurable effects on sales when a jurisdiction using a sales tax has populated areas close to a border of a jurisdiction not using the tax. Harry McAllister discovered significant effects on sales in border cities in Washington state,[15] and W. Hamovitch concluded that New York City retailers lost substantial revenue to nearby states when the latter did not have sales taxes.[16] On the other hand he concluded that Alabama, with little of its population located close to borders and with taxes in the neighboring states, suffered little loss. An econometric study by John Mikesell concluded that municipal sales taxes cause significant loss of sales to nontax areas.[17] On the whole the dangers of locational influences are most significant for local sales taxes that are not uniform throughout a trading area.

A second type of distortion with a retail sales tax arises from the application of the tax to some producers goods, such as industrial machinery and equipment, building materials, office supplies, fuel, etc. A few states make a strong effort to exclude major classes of producers goods, but most do not, except for sales for resale, including goods becoming physical ingredients of articles produced for sale. Taxation of producers goods may affect location decisions of business firms and may affect choice of methods of production, since some methods will result in greater tax burden than others. As sales taxes increase in rate, exclusion of producers goods becomes increasingly important but this type of change in the tax structure has little political appeal and reduces revenue. Administrative considerations make complete exclusion of all producers goods difficult, since all purchases for business use cannot be identified at time of sales, but major classes can be excluded from tax.

A third type of distortion arises from nonuniform coverage. If some goods are exempted, or as is customary, few services are taxed, consumers are encouraged to buy more of the exempt goods and fewer taxable goods, thus distorting choice away from the optimum and potentially producing excess burden. Taxation of producers goods has some effect of this type also, since this portion of the tax will be more significant relative to final selling prices for some consumer goods than for others.

Despite these effects the overall distorting effects of a sales tax appear to be minor compared to those of property taxes, and they can be minimized by (1) avoiding consumer goods exemptions except when there is strong justification, (2) excluding major categories of producers goods from tax, and (3) avoiding geographic rate differentials within metropolitan areas.

Administration and Compliance

The sales tax is basically an easier tax to operate than a property tax since no constructive valuations are needed (with minor exceptions), the tax rate being applied to actual sales figures. So long as the tax structure is kept simple, the task of the retailer is not a difficult one, requiring merely the addition of the tax at the cash register and determination of tax liability each month by applying the tax rate to the figure of taxable sales. An audit program involving examination of vendors' accounts is necessary, but the cost of audit is seldom in excess of 1 percent of revenue gained from the tax. The task of the retailer is made unnecessarily difficult in some states by the nature of the tax. A number of exemptions, with fine lines of distinction between taxable and exempt goods, is perhaps the major source of difficulty. Incorrect application of tax by clerks results, and the task of record keeping is complicated, with a new avenue opened for evasion. Audit is made more difficult and costly. Minor provisions of the acts sometimes cause retailers unnecessary headaches, such as the rule that the retailer pay the state the exact sum collected in tax from customers.

The chief administrative difficulty arises with interstate sales. A state cannot tax sales made for delivery outside the state; the state of the purchaser can apply the use tax but cannot effectively reach the purchaser except on automobiles and a few other goods. Only by requiring the out-of-state vendor to collect and remit tax can the states be assured of their revenue. But the courts have restricted the powers of the states to enforce collection from out-of-state vendors, and proposed Federal legislation would restrict the powers still more drastically. Even if the states had the power, they would not be able to enforce tax effectively against out-of-state firms selling only by mail to numerous customers in the state.

Serious complications are created for compliance and enforcement when local sales taxes are applied on the basis of location of the purchaser, with local use taxes imposed on purchases made in other local jurisdictions in the state. The vendor must collect tax on the basis of place of delivery, the task of applying and reporting tax is greatly complicated, and, with local collection, many local units are not actually able to enforce tax against outside vendors selling into the area. Record keeping and audit are greatly complicated. When local sales taxes are locally collected, as in a few states, complications for the vendor are multiplied still further, particularly if the bases of the tax are different. Unnecessary nuisance is created through the need for filing more than one tax return. Audit by the local governments—if any—duplicates state audit. Probably no greater mistake was ever made by the states in the tax field than allowing local governments to impose and collect their own sales taxes, with liability dependent upon place of delivery and a tax base different from that of the state levy.

Revenue Elasticity

While presumably consumption of taxable goods rises less rapidly than income, the differential does not appear to be great. Estimates of revenue elasticity of the tax range from .9 to 1.05.[18]

Additional Revenue from the Sales Tax

There are several ways in which the states can gain additional revenue for education from the sales tax:

1. *Introduction of the Tax in the Five States Not Using It.* This change has little impact on the national picture, but is of great importance for the five states. Introduction in Alaska, except to replace the present local taxes by a simpler statewide tax, is less important, as substantial revenues are already being obtained from the tax at the local level.

2. *Rate Increases.* The experience of states with 5 percent rates suggests that this figure causes no measurable economic disturbances (except minor ones arising out of interstate complications), and with proper adjustment of the tax causes no serious inequity. Table 10-2 indicates the additional revenue available to the states from raising the state rate to 5 percent.

Increasing the sales tax rate to 5 percent in all states would increase the yield from the tax by about $6.4 billion a year, with the assumption that sales volumes are relatively insensitive to increase in the sales tax rate. Each additional 1 percent increase would bring in an additional $3.7 billion, or, with the broader base noted below, $4.5 billion— again with the given assumption about demand elasticity. Figures by state are given in Table 10-2 and in summary fashion in Table 10-3. A state rate of 5 percent would run the combined state-local rate above 5 percent in the states in which local taxes are imposed, to a figure of 8 percent in some jurisdictions. If all local sales taxes were eliminated when the state rate was raised to 5 percent, the net gain would be about $5.1 billion instead of $6.4 billion. These are 1969 figures; for 1971, the estimates should be increased by at least 10 percent.

TABLE 10-2
PRESENT AND POTENTIAL SALES TAX REVENUES, BY STATE

			Additional Revenue				
	Tax Rate 1969	*Revenue, 1969*	*Per 1% of Tax Rate Present Taxes*[1]	*From Raising Rates to 5%*	*From Including Consumer Services at 5% Rate*	*From Eliminating Consumer Exemptions*	*Per 1% of Tax With Broader Base*
Alabama	4	197	49	50	25		54
Alaska	—	0	7	35	4		8
Arizona	3	148	49	100	25		54
Arkansas	3	104	35	70	17		38
California	4	1684	421	421	210	520	567
Colorado	3	123	41	82	20		45
Connecticut	3½[3]	174	50	75	25	63	67
Delaware	—	0	12	60	6		13
Florida	4	574	143	143	72	180	193
Georgia	3	308	103	206	51		113
Hawaii	4	137	34	34	—		34
Idaho	3	38	13	26	5		14
Illinois	4¼[3]	996	234	174	107		257
Indiana	2	199	100	300	50		110
Iowa	3	208	69	138	—		69
Kansas	3	137	46	92	23		51
Kentucky	5	248	50	—	25		55
Louisiana	2	160	80	240	20		84
Maine	4½[3]	70	15	7	8	19	21
Maryland	3[3]	197	66	132	33	82	88
Massachusetts	3	158	53	106	26	88	76
Michigan	4	795	199	200	100		219
Minnesota	3	174	58	116	30	75	79
Mississippi	4[3]	174	44	44	—		44
Missouri	3	296	99	200	50		109
Montana	—	0	12	60	6		13
Nebraska	2[3]	70	35	105	17		38
Nevada	2[3]	44	15	30	11		20

Table 10-2 (Cont.)

	Tax Rate 1969	Revenue, 1969	Additional Revenue: Per 1% of Tax Rate Present Taxes[1]	From Raising Rates to 5%	From Including Consumer Services at 5% Rate	From Eliminating Consumer Exemptions	Per 1% of Tax With Broader Base
New Hampshire	—	—	14	70	7		15
New Jersey	3[3]	265	88	176	25	130	119
New Mexico	3[3]	87	29	58	—		29
New York	2[3]	699	350	1050	100	440	458
North Carolina	3	240	80	160	40		88
North Dakota	3[3]	36	12	24	6		14
Ohio	4	621	155	155	78	200	210
Oklahoma	2	104	52	156	26		58
Oregon	—	0	40	200	—		44
Pennsylvania	6	891	148	—	90	225	211
Rhode Island	5	72	14	—	7	18	20
South Carolina	3[3]	138	46	92	23		51
South Dakota	3[3]	46	15	30	7		17
Tennessee	3	229	76	152	38		84
Texas	2[3]	538+	179	360	90	250	247
Utah	3[3]	65	22	44	5		23
Vermont	3	0	8	40	4		9
Virginia	3	211	70	140	35		77
Washington	4½	425	94	47	47		104
West Virginia	3	77	26	52	—		26
Wisconsin	3[3]	117	39	78	10	100	67
Wyoming	3	29	10	20	5		11
Total		12,296	3,790	6,350	1,669	2,390	4,515

From U.S. Bureau of the Census, *State Tax Collections in 1969*, adjusted to exclude Washington and West Virginia gross receipts business taxes and Indiana gross income tax, and to include separately imposed taxes on hotel-motel service and sale of automobiles that are essentially portions of sales tax structures.

[1] For the states not using the sales tax in 1969, revenues are estimated.

[2] 3% if the mandatory 1% local sales tax is included.

[3] By July 1, 1970, rates had been changed as follows: Connecticut to 5%; Illinois to 4%; Maine to 5%; Maryland to 4%; Mississippi to 5%; New Jersey to 5%; Nebraska to 2½%; New Mexico to 4%; New York to 3%; South Carolina to 4%; South Dakota to 4%; Texas to 3¼%; Utah to 4%; Wisconsin to 4%.

There are good reasons for restricting the rates to 5 percent, at least in the immediate future, in view of the interstate problem, the difficulty of complete exclusion of producers goods from tax, and the failure of the sales tax designed to contribute toward progressivity.

Some states sacrifice revenue needlessly by applying lower rates to automobiles. These include, with respective motor vehicle and general rates: Alabama, 1.5 percent and 4 percent; Florida, 3 percent and 4 percent; Mississippi, 3 percent and 5 percent; North Carolina, 2 percent with $120 maximum and 3 percent; New Mexico, 2 percent and 4 percent; South Dakota, 3 percent and 4 percent; Texas, 3 percent and 3.25 percent; Virginia, 2 percent and 3 percent. This differentiation makes no sense whatever, given the relationship of automobile purchases to incomes; it makes the taxes more regressive and sacrifices substantial revenue.

The suggestion is sometimes made that higher than basic rates might be applied to luxury goods. Such a system is hard to implement because of the tasks created for vendors in applying more than one rate and discriminates among consumers on the basis of individual preferences. Uniformity of rate, with progression provided by incomes taxes, is greatly preferable.

TABLE 10-3
SUMMARY OF ESTIMATED ADDITIONAL REVENUE FROM SALES TAXES

	Millions of Dollars
Total Sales Tax Revenue, 1969 Fiscal Year	**$12,296**
Additional Revenue:	
From increases in state rates to 5%	6,350
From extention of tax to consumer services	1,600
From elimination of food and clothing exemptions	2,390
Total	**10,340**
Additional Gain from Each 1% of Tax Revenue:	
With existing coverage	3,700
With elimination of food and clothing and taxation of consumer services	4,500
Possible Offsets:	
Elimination of local sales taxes	1,300
Establishment of credit for sales tax paid on minimum expenditures against income tax liability, at $10 person, limited to lower incomes	250

SOURCE: Based on data in U. S. Bureau of the Census, *State Tax Collections in 1969*, with adjustments as noted in Table 10-2.

Improved Structure of the Taxes

The structures of the sales taxes have often been designed without careful attention to the criteria. There are several ways in which redesign could increase revenue and simplify operations:

1. *Exemptions.* Exemptions of various classes of consumption goods from sales taxes are objectionable in several ways. Revenue is sacrificed; exemption of food, for example, reduces the yield by 20 to 25 percent. Some exemptions pave the way for demand for additional ones. All exemptions complicate the application of the tax. Merchants must distinguish between exempt and taxable sales; questions of interpretations arise; additional opportunities are created for evasion; record keeping is complicated; and audit by the state is made much more difficult. Any exemption inevitably favors those persons whose preferences for the taxed goods are relatively high.

The most common of the major exemptions is that of food, provided now in 15 states[19] (and to a limited extent in a sixteenth, North Dakota). This exemption does reduce both the absolute burden on the poor and the regressivity; a sales tax with food exempt is more or less proportional, except at the high income levels. But food exemption is far less satisfactory in accomplishing the objectives than is the system of providing a credit against income tax representing sales tax paid on a minimum necessary level of expenditures, with cash refund to those having no income tax liability. This system removes the tax burden completely from the lowest income groups, whereas food exemption does not. At the same time, it avoids a large unnecessary loss in revenue on food purchases in the middle and higher income groups. Since food expenditures rise with income the exemption is greater at the higher income levels. Many food expenditures are in no sense necessary; the exemption favors those families concentrating luxury spending on expensive and exotic foods. Food exemption significantly complicates the tasks of the retailers in applying the tax and keeping records, makes audit more difficult, and increases evasion. The income tax credit increases somewhat the number of no-tax income tax returns, but these can be handled easily and inexpensively with modern computer equipment, as demonstrated by the experience of states such as Indiana that use the system. Elimination of food exemption in the states now providing it would increase tax yields by about $2 billion—whereas a $10 tax credit per person would cost these states less than $1 billion, even if provided to all taxpayers, and much less, perhaps $250 million, if granted only to persons with lower incomes.

Similar reasoning applies to exemption of drugs and medicine, although with less force; there is greater justification for allowing specific exemption of prescription drugs than food, because expenditures on drugs are unevenly distributed among families at given income levels. By their nature these drugs do not attract voluntary luxury. Exemption should, for control purposes, be confined to items sold on prescription.

The argument applied to food exemption is valid with even greater strength for other exemptions, such as clothing, as provided by several states. Recent studies show that a clothing exemption does not lessen regressivity[20] All of these exemptions complicate the tax and reduce rather than increase equity in many respects. Likewise the exemption of cigarettes and motor fuel is objectionable; it is far simpler to apply tax to these goods than to exclude them, even though separate excises are also applied. Motor fuel tax revenue is almost always restricted to highway finance; there is no reason why consumers of motor fuel should not also make a contribution to financing of education and other state activities as well.

The same arguments do not apply to exclusion from tax of various producers goods—although these exclusions do complicate operation of the tax.

2. *Services.* The sales taxes initially applied only to sales of intangible personal property. It has long been recognized that there is no logic in taxing commodities alone, and gradually a number of states have applied the tax to a limited range of services. If the tax is confined to those of a type typically rendered by commercial (as distinguished from professional or personal service) establishments to individual consumers, there is a strong case for taxation. Most of these firms, such as repair shops, are registered taxpaying vendors anyway, and it is far simpler to tax them on their entire charges than on charges for materials only. Broadening the base in this fashion would increase revenue—although by no more than 10 percent. The principal activities covered would be fabrication and installation of all forms of tangible personal property in real property (but

not real property contracts), repair, cleaning, and all related activity; laundry and dry cleaning; hotel and motel service; rental of tangible personal property; and similar activities. Barber shop and beauty parlor service can justifiably be included, but doing so adds to administrative costs, since there are large numbers of small barber shops, many are not registered vendors, and control is somewhat difficult.

Some states have considered much broader coverage of services, to include all professional services, transport, and other activities.[21] Such proposals, however, encounter serious difficulties and objections and are not recommended. First, many of these professional services are of such character that taxation is not regarded as desirable on grounds of equity and social policy. Medical, dental, hospital, and educational services are examples. Many of the other services are rendered primarily to business firms, and taxation of them is objectionable on the same basis as is taxation of any producers goods. Taxation of these services offers strong incentive to firms to produce the services within the firm. For example, firms are encouraged to ship goods on their own trucks rather than by public carrier if freight is taxed.

3. *Gross Receipts Taxes.* Similar arguments apply to the gross receipts taxes of the Hawaii, West Virginia, and Washington varieties. These apply in part to nonretail businesses, thus discouraging the location of wholesaling and manufacturing in the states. Frequently they have multiple-application features, applying to the receipts from each transaction through which a commodity passes, encouraging integration in production and distribution channels, and discriminating against the small nonintegrated firms. As sales taxes they are highly objectionable on economic-distortion and equity grounds; as business occupation levies they are inferior to net income taxes or value added taxes subsequently noted. Some elements in these structures, such as severance taxes, may be justified in particular instances.

Improved Administration

Study of sales tax operation suggests that no mass evasion of sales tax is occurring. But it is also obvious that most states have not extended their audit programs far enough to maximize revenue from the taxes. California, with the most effective audit program, has roughly 1 auditor to every 550 accounts; in most states the figure is 1 per 1,000 to 2,000 as shown in Table 10-4. The high productivity of dollars spent on audit—usually several times—suggests that further expansion is warranted in virtually all states. Higher salaries to attract and retain competent auditors are also necessary; in some states the level of competence is not high. It is unlikely that any state can increase its revenue more than 5 percent by this means—but this gain is not negligible. Equity among vendors is also increased by more effective enforcement. Some states lose revenue by failing to take adequate and speedy measures against delinquent vendors.

TABLE 10-4

NUMBER OF SALES TAX VENDORS PER AUDITOR, SELECTED STATES, 1969-70[a]

	Vendors	*Auditors*	*Vendors Per Auditor*
Alabama	46,000	100	460
California	363,000	667	544
Connecticut	61,000	50	1,220
Florida	208,000	100	2,080
Georgia	75,000	85	882
Hawaii	50,000	32	1,562
Iowa	78,927	51	1,547
Kansas	53,000	20	2,650
Kentucky	67,000	25	2,680
Louisiana	60,000	30	2,000
Maine	30,000	28	1,071
Maryland	48,000	77	623
Michigan	110,000	300	366
Mississippi	57,000	60	950
North Carolina	95,461	96	994
Ohio	211,000	209	1,009
Oklahoma	49,200	36	1,366
Pennsylvania	215,000	170	1,265
Rhode Island	18,000	37	486
South Carolina	53,000	48	1,104
Tennessee	75,000	80	937
Wisconsin	78,400	33	2,370

[a] Data supplied by states. Where auditors handle income taxes as well, time is allocated between the two types of work.

The weak link in operation of state sales taxes is the control of interstate transactions. Legally the states can require the instate purchaser to pay use tax, but this power is effective only on automobiles and a few other expensive items, and on purchases by registered vendors whose accounts are audited. Tax cannot be collected from individuals making small purchases. Effective collection requires the ability to require the out-of-state vendor to collect and remit use tax. The states can do this if the out-of-state firm has a place of business in the state, as do the large mail order houses. But the mere making of delivery into the state or solicitation of business by catalogs does not enable the state to enforce collection, and pending Federal legislation would weaken the powers of the states still more. There is urgent need for effective Federal legislation that would enable the states to enforce payment without placing an intolerable burden on firms making large numbers of small sales into a number of states. The most effective approach is one that would require the vendor to remit tax either to his home state or to the customer state on interstate sales. This is not a perfect solution, but it would eliminate most of the present leakage without injury to interstate sellers.

Local, State, and Federal Use of the Sales Tax

The sales tax is most appropriately employed at the state level. As noted above, local sales taxes have given rise to several difficulties. If they are universal throughout the state at a uniform rate and are state collected, they are tolerable, at least from standpoints of administration and location effects. But disproportionate revenue goes to the local units that have extensive sales volume relative to population and inadequate amounts to ones with large population and little retailing. For example, in Los Angeles County, local sales tax per capita ranges from .04 cents in Hidden Hills to the fantastic figure of $12,051.78 in Vernon; the Los Angeles city figure was $20.55.[22] A much more satisfactory alternative is an increase in the state rate, with the funds returned to the local governments on some basis other than point of collection. By this means, also, there is much greater chance that the funds will be available, in part, for education rather than exclusively for other purposes. In 1969 Mississippi and New Mexico (except for county taxes) took the step of eliminating the local taxes and increasing the state rate.

If local taxes are not uniform, the tasks of the vendors are greatly complicated and location decisions may be influenced. In some states, such as New York, Alabama, and, to a lesser extent, Colorado, the tasks for all concerned have been greatly increased unnecessarily by the variety of local taxes. These states would particularly benefit from a shift toward a uniform state rate with distribution of funds to the local governments.

At the other extreme, it may be argued that Federal use of the tax in lieu of the states would be advantageous in eliminating the interstate enforcement problem and avoiding adverse locational effects. But this is true of virtually all taxes. The complications arising out of state rather than Federal use of the taxes are not of great overall significance and could be alleviated by Federal legislation relating to interstate commerce. If the Federal system is to be preserved the states must retain autonomous revenue sources—and this is the most productive levy that they can operate with minimum difficulty.

To add a Federal sales tax on top of the state levy would seriously impair ability of the states to raise revenue from the tax and lessen their financial autonomy; it would also create all of the evils noted above of sharp increases in the state taxes and lessen the total amount of money available for education. Since the Federal government can easily raise its required revenue via the income tax, there is no need for it to infringe upon the major state revenue source. Some writers in recent years have stressed the value added tax as the appropriate form of tax for us at the Federal level. Actually this form of sales tax has no significant advantages in a country such as the United States over the usual retail sales tax and would complicate the tax structure unnecessarily.

EXCISE TAXES

State excise taxes are confined, with minor exceptions, to three categories: motor fuel, liquor, and tobacco products. Taxes on motor fuel are appropriately assigned for highway purposes and are not suitable as levies for financing of education (although sales tax should apply to the sale of motor fuel). During the 1968-69 fiscal year, taxes on cigarettes plus minor levies on other tobacco products yielded $2.1 billion or 5 percent of state tax revenue, while levies on alcoholic beverages yielded $1.2 billion, or 3 percent of total tax revenues. The tax on cigarettes ranged from 2 cents to 18 cents a package, with a median figure of 10 cents, in contrast to a median of 3 cents in 1950. Taxes on distilled spirits ranged from $1.20 per gallon to $4.00 per gallon, with a median of $2.25 (1969).

Liquor and tobacco taxes offer the advantage of substantial productivity, widespread popular acceptance, and minimal danger to economic development. But they have limited justification beyond some compensation for social costs for which use of the products may be responsible and the principle that use can appropriately be penalized. The tax on cigarettes is highly regressive, more so than any other major levy. Declining cigarette consumption will likewise limit future productivity of the tax. States that are well below the median could gain additional revenue with little harm by moving to the median, but these levies generally offer little in the way of long range additional contributions to the financing of education. Their revenue elasticity is particularly low—.6 for liquor, .4 for cigarettes.[23]

PERSONAL INCOME TAXES

The inherent advantages of personal income taxation are so well known that only a brief summary is required. Income taxes alone are directly related to the most generally accepted measure of tax capacity and are adjustable on the basis of circumstances affecting tax capacity at given income levels, such as numbers of dependents, medical expenses, and the like. Only the income tax can provide effective progression in the overall tax structure. A properly designed income tax should have minimum distorting effect on the economy, provided all income is treated in a uniform fashion. While progression increases the danger of distortions, particularly of factor supplies, the high Federal income tax rates of the last two decades have produced little evidence of significant adverse effects upon the economy.[24] The Treasury studies of the late sixties showed that the overall progression was much less than the tax rate table suggests, with a substantial degree of inequality of treatment. But these consequences resulted from defects in the Federal income tax structure, not from the use of the income basis for taxation. Responses of revenue to increases in national income is greater than that of any other tax, estimated in the range of 1.5 to 1.8 at the state level.

The personal income tax, by its inherent nature, is of course the mainstay of the Federal tax structure, and with very good justification, partly because of its potential use as an instrument of fiscal policy. Unlike most other taxes the rates can be varied from time to time in light of changing business conditions and inflationary pressures.

TABLE 10-5
STATE INCOME TAX REVENUES AND POTENTIALS
(FISCAL YEAR)

	Personal Income Tax Revenue 1969 (Millions of $)	*1-1-70 Range of Tax Rates*	*Exemption, Family of 4, ($)*	*Potential Additional Revenue (Millions of $) Oregon Rates*	*Corporate Income Tax Yield (Millions of $)*	*Corporate Income Tax Rate, 1-1-70*	*Potential Additional Revenue Corporate Income Tax 7% Rate (Millions of $)*
Alabama	74.9	1.5-5	3600	174	29.0	5[11]	33
Alaska	25.2	16% of Fed.	2400	8	4.3	5.4-9.36	1
Arizona	52.7	2-8	3200	97	18.1	2-8[11]	12
Arkansas	37.7	1-5	[7]	100	22.4	1-6	20
California	1086.9	1-10	[7]	1210	592.5	7	—
Colorado	103.5	3-8	3000	100	32.0	5	13
Connecticut	—	—	—	378	86.2	8	—
Delaware	61.4	1.5-11	2400	—	15.1	6	3
Florida	—	—	—	588	—	—	196
Georgia	139.2	1-6	4200	242	73.0	6	12
Hawaii	86.5	1.25-11	2400	—	13.7	5.85-6.435	2
Idaho	38.5	2.5-9	2400	17	10.0	6	1
Illinois	—[1]	2.5	4000	1313	—[1]	4	437
Indiana	181.5	2.	3000	337	8.8[8]	2	164
Iowa	106.9	.75-5.25	[7]	173	24.1	4-8[11]	18
Kansas	72.4	2.-6.5	2400	155	20.1	4.5[11]	45
Kentucky	107.6	2-6	[7]	148	39.4	5-7[11]	30
Louisiana	44.5	2-6	5800	249	34.6	4	27
Maine	—[1]	1-6	4000	83	—[1]	4[11]	27
Maryland	365.8	2-5	32000	54	54.7	7	—
Massachusetts	452.6	4	3800	187	185.1	7½	—
Michigan	390.2	2.6	4800	177	216.8	5.6	55
Minnesota	304.2	1.5-12	[7]	62	82.6	11.33[11]	—
Mississippi	20.4[2]	3-4	6000	126	33.3	3-4	35
Missouri	118.2	1-4	3200	335	18.5	2[11]	75
Montana	31.2	2-11	2400	30	8.1	6.25	1
Nebraska	36.6	10% of Fed.	2400	103	6.9	2	16

Table 10-5 (Cont.)

	Personal Income Tax Revenue 1969 (Millions of $)	*1-1-70 Range of Tax Rates*	*Exemption, Family of 4, ($)*	*Potential Additional Revenue (Millions of $) Oregon Rates*	*Corporate Income Tax Yield (Millions of $)*	*Corporate Income Tax Rate, 1-1-70*	*Potential Additional Revenue; Corporate Income Tax 7% Rate (Millions of $)*
Nevada	—	—	—	53	—	—	15
New Hampshire	2.9[2]	4.25	600	66	—	—	20
New Jersey	14.5[3]	2-14	2400	825	156.6	4.25	90
New Mexico	19.6	1-9	2400	60	5.1	5	2
New York	2151.6	2-14	2400	98	610.3	7	—
North Carolina	239.6	3-7	3200	168	112.5	6	19
North Dakota	14.0	1-11	2700	37	2.2	3-6[11]	3
Ohio	—	—	—	1113	—	—	370
Oklahoma	47.8	1-6	3000	170	22.1	4[11]	35
Oregon	204.3	4-10	2400	—	37.5	6	6
Pennsylvania	—	10[4]	—	96	28.1	7.5	—
Rhode Island	—[1]		—	1203	284.0	7	—
South Carolina	84.4	2-7	3200	105	40.5	6	7
South Dakota	—	—	—	57	.6	5.5	12
Tennessee	11.4	5	—	295	61.6	5	24
Texas	—	—	—	996	—	—	330
Utah	50.9	2-6.5	2400	36	10.6	6[11]	7
Vermont	34.0	25% of Fed.[6]	2400	5	5.6	6	1
Virginia	273.4	2-5	2600	150	67.5	5	27
Washington	—	—	—	363	—[9]	—	110
West Virginia	31.0	1.5-5.5	2400	104	4.1[10]	6	1
Wisconsin	461.9	2.7-10	[7]	—	101.0	2-7[11]	120
Wyoming	—			30	—	—	8
Total	7,579.8			12,476	3179.6		2430

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[1] Not in operation 1969 fiscal year.
[2] High exemption.
[3] From New York sources only.
[4] Income from capital only.
[5] Limited scope.
[6] +15% surcharge.
[7] Tax credit in lieu of exemption.
[8] Plus $150 million gross income tax.
[9] $98.6 million gross receipts tax.
[10] Plus $89.6 million gross receipts tax
[11] Federal tax deductible from income.

Source of Basic Data: U.S. Bureau of the Census, *State Tax Collection in 1969*, ACIR, *State and Local Finance, 1967-1970*.

State-Local Use

At the state level, the income tax offers the general advantages of income taxation, providing greater equity for the state tax structures, lessening the absolute burden on the lowest income groups encountered with other taxes, providing at least a limited degree of progression, and ensuring greater response of state revenue to increases in personal income. Given the resistance to other taxes, a state can gain greater revenue with an income tax in the tax structure than otherwise. Table 10-5 summarizes the income tax picture by state, with yields for the 1969 fiscal year and rates and exemptions as of January, 1970. As of January 1, 1970, 41 states were using the tax; the exceptions were Connecticut, Florida, Nevada, Ohio, Pennsylvania, South Dakota, Texas, Washington, and Wyoming. However, the taxes in Rhode Island, New Hampshire, New Jersey, and Tennessee are of very restricted coverage. In fact, therefore, only 37 states make effective use of the tax.

Unlike the sales taxes, which are basically very similar, the income taxes vary widely. The Mississippi levy, for example, applies only to married persons with incomes in excess of $6,000, whereas in 13 states the figure is $1,200. Initial rates range from .75 percent to 4 percent, top rates from 2 percent to 14 percent. Three states with general levies have proportional rates. Three states base their liability on that of the Federal tax; the Vermont tax is 25 percent of the Federal tax liability, plus a 15 percent surcharge. One of the best measures of the height of the taxes is the ratio of state income tax to total adjusted gross income as reported for Federal income tax; these range from .4 percent (Mississippi) to 3.8 percent (Wisconsin).[25] Table 10-5 gives some indication of the degree of diversity.

Local income taxes are significant in seven states and used in one city in an eighth (Alabama); these taxes are summarized below:

State	*Rate*	*Usage*
Kentucky	1% typical; 2% high	20 cities, including large ones plus one county
Maryland	20% to 50% of state tax	Baltimore city, plus 22 counties
Michigan	1%	10 cities, including Detroit
Missouri	.5%; 1%	St. Louis, Kansas City

New York	.4 to 2%	New York City only
Ohio	25 to 1%	Most cities and villages, large and small
Pennsylvania	.5 to 2%; many 1%	About 3,000 local governments, including 1,000 school districts

All of these taxes are locally collected; two of the states in which use is most widespread (Ohio and Pennsylvania) do not have state income taxes. Outside of Michigan and Maryland, the local taxes usually apply only to wage and salary income, rather than to all forms.

Evaluation

State use of income taxation is strongly justified, for reasons suggested above. Interstate problems with personal income taxes are not serious; as the state of residence normally allows credit for tax paid the state where the income is earned, there is little double taxation. Likewise there is little escape from taxation. States rely heavily on IRS information and audit for control of income taxes. There are practical limits, however, to the potential revenue, given the relatively high Federal income taxes. To the taxpayer the combined rate is the significant element, and the Federal tax is—as it should be—sufficiently high that the margins for the states are limited. A number of the taxes are extremely low, however. If the Oregon levy is taken as a model, with rates from 4 to 10 percent and exemption of $600 per person, the states as a whole would obtain $20.1 billion from the tax instead of the present $7.6 billion, on the basis of rough expansion on the basis of total personal income. Estimates by state are given in Table 10-5. Because of variations in per capita incomes by state, these estimates are only very rough. Low income states will not be able to raise as much as indicated and high income states can raise more.

A few features of the structure warrant attention. Progression in rates is much less important than might be expected; deductibility of state income tax liability in determining Federal income tax greatly reduces the significance of progression in rates. The exemption provides a considerable degree of progression. On the other hand the Federal experience of recent years suggests the need for a broad definition of income, including full taxation of capital gains (in view of the limited progression) and minimization or perhaps complete elimination of all personal deductions except the exemption for the taxpayer and each dependent. Theoretically deductions should improve the equity of the tax, but the Federal experience has not been encouraging. The practice in three states of defining tax liability as a percentage of Federal liability has the merit of simplicity but opens the state levies to the defects of the Federal and makes the state yield vary with changes in Federal rates unless offset by state legislation. Using the Federal adjusted gross income figure with deduction of a specified personal exemption for each taxpayer is a preferable alternative.

Use of the income tax at the local level is much more questionable. Separate collection of a local income tax, as is the common policy, compounds the nuisance to the taxpayer. A large portion of income is interjurisdictional, earned in one local area by a resident of another. As a consequence, opportunities for multiple taxation are substantial and control is made much more difficult. Local governments are not in a position to audit income tax returns independently; all they can do is to rely on information in state and Federal returns. But these returns do not localize income sufficiently for local income tax purposes. In practice most of the local income taxes are confined to wage and salary income, thus discriminating against this form relative to others. Given the small size of local units, distortion of location may be significant. If liability depends upon residence, persons have incentive to select those cities in a metropolitan area that do not use the tax. With liability on the basis of place of earning and withholding, business firms are given an incentive to locate plants in jurisdictions not having the tax. But regardless of locational impact, the nuisance factor alone suggests the need to avoid local income taxes except in unusual circumstances and to distribute a portion of state income tax yield to local governments, including school districts.

So far as the Federal government is concerned, given the usually accepted criteria of taxation and the importance of sales taxation at the state level, there is strong justification for primary Federal reliance on the income tax. There is obvious need for further reform of the Federal tax beyond that provided by 1969 legislation, if the tax is to accomplish its objectives in the desired fashion. Discussion of reform of the Federal income tax, however, is outside the scope of this paper.

GENERAL LEVY ON CORPORATIONS

Most states have some form of general levy on corporations. In part these are regarded as supplements to the personal income tax (although four states have a corporate tax but no personal tax). But primarily the taxes are a means for ensuring that the state in which the business operates receives some compensation for the services it renders to the firm.

Currently, the general levy takes the form of corporation income tax in 42 states and partially in another (Indiana). Washington, and in part Indiana, use gross receipts taxes as general business taxes, distinct from their sales taxes, and West Virginia does so in addition to the corporate income tax. Two of the other states have corporate franchise taxes based on capital stock that are relatively productive of revenue. The other four states—Florida, Nevada, New Hampshire, and Wyoming—have no effective general corporate levy. The median rate of the corporate income tax is 5.7 percent (January, 1970), with a range from 1 percent (Missouri) to 12 percent (Pennsylvania.) Some of the states have a limited amount of progression; the remainder use proportional rates. Interstate income is usually allocated on the basis of a formula. The corporate income tax currently yields $3.2 billion, 7.6 percent of state tax collections (1969 fiscal year).

The state corporate income taxes can be justified as desirable elements in the tax structure on the bases suggested above. They provide a means on a current basis of reaching income earned by corporations and an effective means of obtaining revenue from corporations owned outside of the state yet benefiting from state services. Revenue elasticity, 1.2 to 1.3, is higher than that of other levies except the personal income tax.[26] While the final distributional effects of the taxes are not clear, they appear to accord reasonably well with accepted standards of equity. Administration is simple because of the ability to rely on Federal returns and Federal audits as the primary basis of control. Interstate problems are minor so long as uniform formulas are employed for allocation of interstate income, although some nonuniformity still exists. The taxes are not likely to have distorting effects upon location decisions so long as they are more or less uniform among states. Even with the nonuniformity that has prevailed (one major midwest industrial state, Ohio, does not yet use the tax, and Illinois and Michigan have commenced to do so only in recent years) there is no measurable effect on location of industry. If the differentials became too great, however, particularly within metropolitan areas extending over state lines, there would inevitably be some influence. A state cannot safely go too far out of line from its neighbors.[27] As a political matter, corporate income taxes are usually essential if voters are to accept personal income taxes. The chief obstacle to substantial increases in the state corporate income taxes—apart from interstate differentials—is the high level of the Federal tax. With Federal rates in the neighborhood of 50 percent, there is a limit to the amount the states can impose without strong resistance by business groups and possible adverse effects upon economic development. If all states used a 7 percent rate, however, total yield would be about $5.4 billion instead of the present $3.2 billion.

The gross receipts basis used for general business levies by a few states (and as supplements to the retail sales tax in a few others) are objectionable on many grounds. To the extent that they are shifted they have distributional effects comparable to those of sales taxes. In practice shifting is likely to be difficult for many firms because of interstate differences, and the taxes rest on the owners in a highly capricious fashion. Because of their cumulative nature they distort business methods, encouraging integration and leading firms to produce goods and services themselves instead of acquiring them from other firms. Under no circumstances should states not now employing them turn to them. Capital stock taxes are equally capricious in their effects, being tolerable only because the rates are low.

In some states the proposal has been advanced to replace gross receipts taxes or corporate income taxes by a tax on value added, and Michigan used this form of tax for its general business levy for a time. The primary argument is along benefit lines: corporations benefit from state services and should pay accordingly for this "input" into the production process. The best measure of the benefits received by any firm is the value it adds to the materials and other goods it buys—the difference between its receipts and the cost of goods it purchases from other firms. This approach ensures that all firms pay for the inputs of state services whether the firms are profitable or not, whereas the corporate income tax does not. Value added is a much better measure of benefits received than gross receipts, and the value added tax avoids the economic distortions created by a gross receipts tax.

It is obvious that a value added tax is preferable on several grounds to a gross receipts tax. But its advantage over a corporate income tax is not clear. The latter complements the personal tax much more effectively than a value added tax; there are fewer interstate complications; and it may be argued that net earnings is a better basis for taxation than value added, certainly in terms of distributional effects. At any rate, given the widespread use of the corporate income basis, it is more satisfactory from the standpoint of any one state than the value added tax and general change to the latter is most unlikely.

In general, therefore, the most suitable approach for additional revenue in this field includes the following:

1. Establishment of the corporate income tax in those states not now using it, replacing capital stock and gross receipts taxes where these are used.
2. Use of a rate of perhaps 7 percent in those states now using lower figures. These two changes would add about $2.5 billion to state tax revenue (Table 10-5)
3. Greater uniformity in allocation of interstate income, to minimize the compliance tasks and the danger of double taxation, and restrictive federal legislation.

At the Federal level, the corporate income tax is the second most productive tax, yielding $37 billion in the 1969-70 fiscal year, or 18 percent of total tax revenue. It is certain to remain a major source of Federal revenue despite serious questions about distributional effects. The question of whether the corporate income tax is reflected in higher prices or not has been subject to extensive debate and to a number of empirical studies, which show conflicting results. It is impossible at present to be certain as to the shifting of the tax. Further exploration of the tax and of possible reforms is beyond the scope of this paper.

OTHER POSSIBLE SOURCES OF REVENUE

At the state level, there are no major potentials for tax revenues beyond those noted. A few states are able to gain substantial revenue from severance taxes on the output of petroleum and minerals, and others could undoubtedly gain additional money from this source. Estate and inheritance taxes are not productive of substantial amounts. They could be made more effective than they are, but the overall potential is not great relative to other major sources. Other state levies, such as those on public utility or insurance companies, are essentially supplements to sales or income taxes. There is no major avenue to which the local governments and the states can turn for large sums of revenue.

The same considerations apply at the Federal level; there are no new major untapped taxes. The argument for a Federal value added tax often advanced in recent years is merely a disguised argument for a Federal sales tax. The Federal government can raise all revenue needed from the current pattern of income taxes, with some modifications in structure; the sales tax can be left to the states as the major source of state finance for education and other purposes.

SUMMARY

By generally accepted standards of taxation, additional funds for the financing of education cannot, on any significant scale, be found in the local property tax, or in expansion of local nonproperty taxes, but from expanded state use of sales and income taxes, plus reliance on Federal income taxation for Federal grants. More specifically:

1. Most states can make more effective use of sales taxation, by increasing the rate to at least 5 percent and ultimately beyond, and by broadening the structure to eliminate most exemptions of consumption goods and to include some services. At the same time, to alleviate burden on the lowest income groups and lessen opposition to the tax, credit should be given against state income tax for an amount representing sales tax payments on basic necessary expenditures, with cash refund when the person has no income tax liability.
2. Most states can make more effective use of income taxation, in some by lowering exemptions, in many states by broadening the coverage of the tax by reducing deductions and including tax free income, and by the use of higher rates.
3. The corporate income tax should be the primary general business levy, replacing gross receipts and capital stock taxes where these are still used. Many states can gain substantial revenue by raising the rate to the median figure.

4. Local sales taxes and, to an even greater extent, local income taxes are objectionable in a number of respects and should be integrated into the state levies, except in unusual circumstances when one or a few cities require much more revenue than others.

5. The Federal government should continue to rely on personal and corporate income taxes, with some revision in structure, as the primary source of funds for educational and other purposes.

The additional revenue potential for 1970, as compared with 1969, is as follows, on the basis of very rough estimates:

Sales Tax:

	Billions of Dollars
Increase in rate to 5% in all states	7.0
Extension to consumer services	1.8
Elimination of food and clothing exemptions	2.5
Total	11.3
Less: Elimination of local sales taxes	1.5
Credit against income tax	.3
Net gain, with 5% rate	9.5
Additional revenue per 1% of rate	5.0
Personal Income Tax:	
Increase to Oregon level	12.0
Corporate Income Tax:	
Increase to 7%	2.5
Total, with sales tax at 5%	24.0
with sales tax at 6%	28.5

These estimates are subject to one major limitation: the higher income taxes and the higher sales tax rates will reduce the base of the sales tax and thus the additional revenue will be somewhat less than the estimate. The magnitude of this effect has been measured by Legler and Shapiro, but not with sufficient predictive accuracy to warrant acceptance.[28]

FOOTNOTES

1. Yield data from U.S. Bureau of the Census, *Quarterly Summary of State and Local Tax Revenue*, April-June 1969, and *State Tax Collections in 1969*, and D. Netzer, *Economics of the Property Tax* (Washington: Brookings, 1966).

2. From 1956 to 1966 the ratio of real property assessments to total assessments rose from 74% to 78%. U.S. Bureau of the Census, *Trends*

in Assessed Valuations and Sales Ratios 1956-1966 (Washington: Government Printing Office, 1970).

3. Netzer, pp. 21-22.

4. Advisory Commission on Intergovernmental Relations (ACIR), *State and Local Finances* (Washington: Government Printing Office, 1969), p. 68.

5. Advisory Commission on Intergovernmental Relations, *State-Local Taxation and Industrial Location* (Washington: Government Printing Office, 1967).

6. Netzer, pp. 72-73.

7. *Ibid.*, pp. 173-83.

8. *Ibid.*, Ch. 3.

9. *Ibid.*

10. *Ibid.*

11. *Ibid.*, p. 189.

12. This will not be true in the future because of the introduction of a state income tax.

13. Most recently by J. M. Schaefer, "Sales Tax Regressivity under Alternative Tax Bases and Income Concepts," *National Tax Journal*, 22 (December, 1969), 516-27.

14. *Ibid.*

15. "The Border Tax Problem in Washington," *National Tax Journal*, 14 (December, 1961), 361-75.

16. "Sales Taxation: An Analysis of the Effects of Rate Increases in Two Contrasting Cases," *National Tax Journal*, 19 (December, 1966), 411-20.

17. "An Analysis of Municipal Sales Taxation," Ph.D. dissertation, University of Illinois, 1969.

18. ACIR, *State and Local Finances*, p. 64.

19. California, Connecticut, Florida, Maine, Maryland, Massachusetts, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Te[illegible], Vermont, Wisconsin.

20. Schaefer.

21. The taxes in Hawaii and New Mexico apply to these services.

22. R. C. Brown, "Observations on the Distribution of Local Sales Taxes in California," *Proceedings of the National Tax Association for 1968*, pp. 27-39.

23. ACIR, *State and Local Finances*, p. 64.

24. R. Barlow, H. E. Brazer, and J. N. Morgan, *Economic Behavior of the Affluent* (Washington: Brookings, 1969).

25. ACIR, *State and Local Finances*, pp. 111-12.

26. *Ibid.*, p. 64.

27. A detailed discussion is found in Advisory Commission on Intergovernmental Relations, *State-Local Taxation and Industrial Location* (Washington: Government Printing Office, 1967).

28. J. B. Legler and P. Shapiro, "The Responsiveness of State Tax Revenues to Economic Growth," *National Tax Journal*, 21 (March, 1968), 48-56.

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CHAPTER 11

Analysis in A PPB Setting

SELMA J. MUSHKIN AND WILLIAM POLLAK

In the present paper we discuss programming for educational development, or the implementation of rules on choice in the public education sector. Programming for educational development (PED) has been defined as a program planning process that calls for analysis of cost and effectiveness of a range of program options within the context of an integrated PPB system.

Analysis, as we use it here, is a process of comparing and assessing costs and benefits of competing programs to support choice. Analysis looks to the application of concepts and tools of a number of disciplines in several rounds of questioning of purpose, methods, cost content, and usefulness in relation to purpose. Analysis calls for more rigorous inquiry than has been customary about the real objectives of public education and other public programs. It calls for the application of methodology of modern science to a reasoning about costs and benefits of competing programs and program levels within a conceptual framework that is drawn largely from economic theory.

There is no fixed set of rules about analysis, nor can there be. Because analysis is concerned with public programs, it requires the imaginative search of policy options and an intuitive sorting

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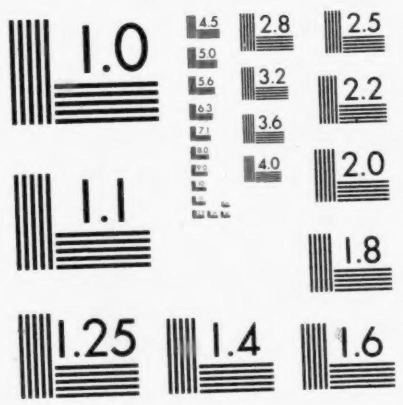
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MICROCOPY RESOLUTION TEST CHART
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out of the politically feasible. Public programs often have multiple purposes or outputs. Comparisons in the past have been made in terms of program inputs—the resources expended, or the costs per unit—for example, the size of the classroom, the number of pupils per teacher, the availability of a gymnasium. The defining of outputs is only a rudimentary stage; moreover, the relationships between program inputs and the outputs achieved have yet to be fully researched. The formulation of output concepts is partly an imaginative, conceptual undertaking. Selection of methods of analysis from among the tools available calls for an intuitive building of models that can bring to light the essential relationships through a simplifying selection of strategic determinants. Analysis is thus a mood of questioning, an art of selection and combining, and an inventive process.

While there are no hard and fast rules, some standard steps have come to be taken in carrying out program analysis. These steps may be summarized briefly as:

1. Defining the problem or problems.
2. Identifying the real or basic governmental objectives involved.
3. Formulating criteria or measures of effectiveness that will capture as fully as possible each of the objectives as defined and will permit measurement of progress toward those objectives. (The criteria should not be limited to those that are quantifiable.)
4. Structuring the problem to make clear the relation of the outputs and inputs involved (or developing some even rudimentary notion of a model).
5. Identifying and describing the key features of alternative ways of attempting to meet the problem. Alternatives may be in the form of different programs or different levels of programs, or both.
6. Estimating the full cost implications of each alternative to include future as well as immediate implications and to provide even an approximate set of figures on the marginal cost of various options. (Variable costs, both capital and operating, would be included, as well as both direct and indirect.)
7. Analyzing alternatives in terms of the effectiveness criteria set forth.
8. Presenting in a clear way the tradeoffs among program options that reflect both costs and effectiveness.

9. Identifying the major uncertainties and the quantification of those uncertainties to the extent possible. (Spillover effects, risks, and unquantifiable aspects of the problem need estimation or description.)

10. Identifying the major assumptions made in the study, with an indication of the degree to which program choices are sensitive to those assumptions.

11. Documenting in a detailed memorandum the study work that was done so that others can understand and evaluate the analysis. The documentation may point to a preferred alternative option.

These rules essentially can be grouped into four phases of work. The first phase is basically the problem-defining phase. What is the problem? Are we asking the right question in terms of our objectives or purposes when we ask, for example: What services are available in a community for linotype training? Should we ask instead: Are young persons finding jobs in the fields for which they are being trained through vocational education? What types of jobs require vocational training? What is the current labor force status and prognosis about those jobs? How long is the period of training? Or to take a different type of problem, are we addressing the right question when we ask: How can we achieve the standard of 25 pupils per teacher? Instead, in terms of our purposes, we might ask: How best can we achieve the learning product we seek in our school system? Or again, are we addressing the right question when we ask about the ways to achieve equal pay for men and women teachers in the school? Perhaps in terms of learning products, one needs to ask: Do men teachers produce more (or less) learning in the classroom than do women?

By systematically attempting to identify the underlying purposes of education and the schools, a framework is set for the development and documentation of relevant information that can help to define the problem, sharpen the issues for decision, and identify the component considerations.

The second phase of the work essentially calls for an imaginative and creative process which is the search for optional ways of meeting the defined objectives. What are the options? What can be done in place of, or as a supplement to, what we are now doing? A questioning process on options systematically carried out yields a range of possibilities for examination as to costs and gains. The product of analysis, with its emphasis on alternatives, would tend to confront school officials with a different kind of decision. In place of the familiar "yes-or-no" response to specific problems, a range of choices is offered in terms of activities, ways of carrying them out to achieve defined objectives, and levels of operation.

The third phase involves identification of the components of costs, both direct and indirect, both capital and operating. Full cost implications into the future, display the costs of alternatives over time.

The fourth phase is essentially the identification of the relative measures of effects or of benefits that are likely to follow from the program options.

In the pages that follow, we present in greater detail some of the issues surrounding the carrying out of these four phases of analysis as they bear on the economics of elementary and secondary education.

OBJECTIVES AND PROGRAM DEFINITION

At an initial stage in the application of economic analysis to a program problem, the analyst and those for whom he works must draw up a list of objectives and, if possible, specify a set of priorities over them. The objectives and priorities are necessarily "value" determined. And the economist feels uncomfortable in the value-ridden world of program definition and objectives setting, despite the theory of economic choices that underlies the analytical approach. The task of objective setting in education is especially difficult. Guidelines for the selection of objectives and lists of objectives, however, have been prepared.

Guideline Criteria

In general the guidelines suggest that those involved draw on their own perceptions as well as observations of the programs they administer to suggest objectives. Objectives, guidelines generally state, should not be formulated so broadly that they relate to all conceivable programs, nor so narrowly that they result in rejection of options which, though they fail to achieve the narrowly stated objective, succeed in satisfying the broader objective to which that narrowly stated objective would be instrumental. Objectives necessarily should be operational if progress toward those objectives is to be measured or translated into measures of effectiveness, while the complete set of objectives should be comprehensive. Failing that, comparisons of options might be biased by the neglect of valued and serviced objectives. Thus in considering school lunch programs, learning outputs as well as physical health objectives must be included if the judgment rendered is not to be incomplete. Although additional guidelines might be cited, or a list of objectives provided, our attention in the following pages will focus instead on the implications of the framework economists have devised and employed for the statement of objectives in education. Before initiating that discussion, however, we briefly examine the nature of education objectives.

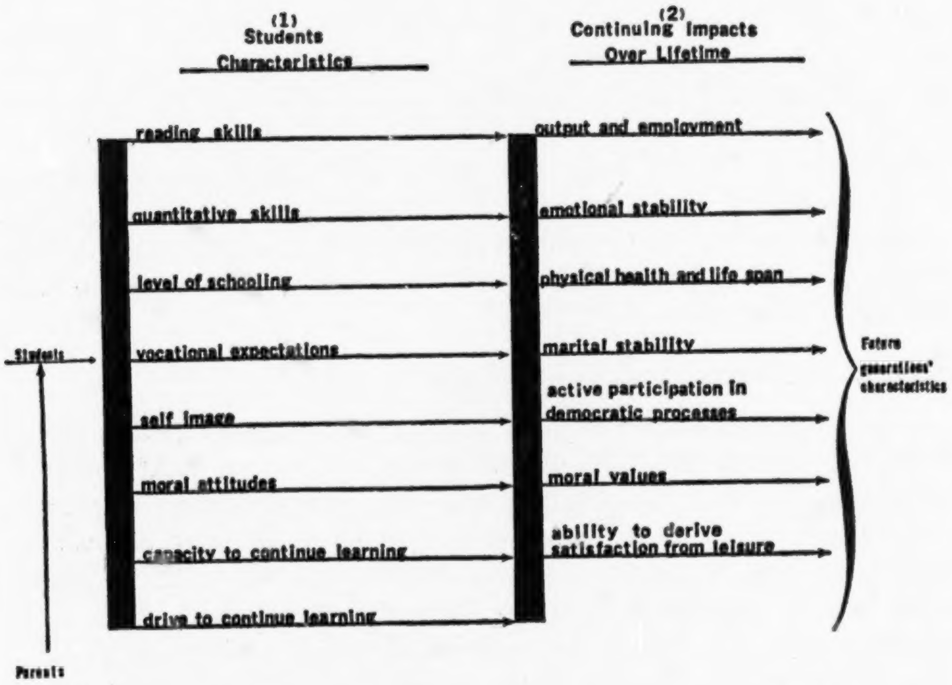
Schools as an Instrument of Change

Education is undertaken at any particular level primarily to change students so that in the period following that level of education the individual will be able to and will behave, perform, and respond differently than in the absence of that education. Education has, of course, effects contemporaneous with its provision, but by and large it is for its continuing effects that it is pursued both as a matter of individual choice and public policy.[1] As a consequence, one can mean by educational objectives either the changes which education makes in individuals, or the longer term continuing *impacts* of these changes on the individual and society. This point can be clarified with the assistance of a simple diagram (Figure 11-1).

Schools change children, and logically the output of the schools should be regarded as the changes they bring about in students rather than the characteristics students possess as they emerge from schools. But objectives are rarely, if ever, stated in "value added" terms; the column labeled "student characteristics" reflects this. Its entries are all characteristics which, if we had the measurement skills, might be assessed upon the termination of any particular level of a student's formal education. We thus shall call them short-run objectives. The particular package of characteristics possessed by the student when he leaves the school system[2] will have significant, if not determining, effects on several aspects of his later life. They will, as the second column implies, strongly influence his lifetime output, moral values, marital and emotional stability, participation in political processes, and so on.

Fig. 11·1

Student Characteristics and Impacts


(1) Students Characteristics
(2) Continuing Impacts Over Lifetime
reading skills
quantitative skills
level of schooling
vocational expectations
self image
moral attitudes
capacity to continue learning
drive to continue learning
output and employment
emotional stability
physical health and life span
marital stability
active participation in democratic processes
moral values
ability to derive satisfaction from leisure
Students
Parents
Future generations' characteristics

References to objectives in the senses of both the first and second column are scattered through general discussions of education, as is apparent from statements, for example, that our schools fail to teach all pupils how to read (student characteristics), and to other statements which place blame, for example, on the schools for their "failure" to eliminate gross income inequalities from society (long-term impacts of changes wrought in individuals). This duality of objectives—or rather the possibility of considering the objectives of education at different points—complicates the identification of objectives from the economist's perspective in ways which will become clear in the discussion that follows. Though schools can most easily focus on objectives in the first sense, there need be no conflict in viewing objectives from the two perspectives.

The Economic Efficiency Framework and Educational Objectives

When economists bring their skills to bear on matters of public policy, their intent is to shed personal value judgments and objectives in order to serve the objectives revealed in one way or another to be public or social objectives. On the assumption, however, that the consumer sovereign goals implicit in the choice of a market economy are appropriate goals for the public sector, the tools (if not the values) of the economist may be used in the consideration of objectives. Specifically, the emphasis of the economist is in revealing the public preferences over different objectives of public sector activities. For example, in applying this perspective (under the rubric "benefit-cost") to the multiple objectives of a dam, the economist indicates the public's "willingness to pay" for flood control, water transportation, recreation, electrical output, and so on. Or, to come a bit closer to education, the analyst considering a health program might attempt to gauge or infer public preferences over such objectives as increased cure rates for different diseases, reduced incidence of different kinds of accidents, etc. Of course the application of the framework to personal services[3] raises more thorny problems than its application to physical investments, but that should not deter us here from exploring the implications of that framework for the analysis of educational objectives.

The framework, it should be stressed, does not select objectives. Rather it may provide a way to weight different objectives which may, given educational production possibilities, be competitive in production. It will remain for educators and analysts to specify and structure sets of objectives, but they may be assisted by the economist in gauging felt relative importances among them.

Having raised the distinction between short- and long-run objectives, it is apparent that there are different ways to apply the economists' analytical framework to the revelation of preferences among objectives. Analysis could be employed to reveal preferences over long-run objectives, to reveal the implications of selected long-run objectives for the selection of priorities among short-range objectives, and finally to reveal preferences over different short-range objectives.

In the paragraphs that follow we consider the extent to which analysis has been employed and is likely to be employed in each of these roles. It is probably accurate to say that no work has been done to identify public preferences over such objectives as lifetime income, emotional stability, physical health, life span, participation in democratic processes, and so on. Nor do we think it likely that such work will be done. This prognosis seems defensible on several grounds. Economists are most comfortable in their quest for knowledge about preferences drawing inferences from market behavior. But it is hard to think of markets in which varying public tastes for the kinds of outcomes just noted can be compared. It is true that one can infer from market behavior tastes over income and leisure and among different ways of using leisure, but such markets are in current uses of currently available things rather than in the future tastes, attitudes, and abilities which are at least partially consequences of formal education.

Furthermore, even if public "willingnesses to pay" for different long-range objectives were easily recorded, it is philosophically questionable whether we should adopt them as social objectives. In other areas the marketplace orientation can be justified by reasoning that only beneficiaries know which objectives it is worth producing for *them.* But in adapting that approach to lower levels of education, one in fact substitutes parental for beneficiary willingness to pay without an appropriate reassessment of the market rationale. *Whichever* course is followed with respect to services for the young, it is not truly a consumer-oriented course but an elitist one which allows either parents or society to choose on behalf of children. Before fully embracing the alleged consumer-oriented view in education, one should at least sincerely consider the complete substitution of parental for social choice which that embrace implies.[4]

Speculation about the revelation of people's preferences over long-range objectives suggests, as it will when we consider short-range objectives, that one determine on a more direct approach to allowing those preferences to be exercised; specifically, easing access of individuals to bank loans for purposes of education, as some have suggested, would allow the direct application of those preferences in that part of the education market which is or could be made private.

As indicated above, analysis can also be used to inform us concerning the implications for priorities among selected longer run objectives over short-range objectives. Such a use of analysis would be useful even if one rejects out of hand the value or possibility of identifying public preferences of long-range objectives in the manner just discussed. In fact, this appears to be the primary way in which analysis has been applied to the area of objectives. We refer here to the several benefit-cost studies in education which, in essence, suggest what the implications of a lifetime income objective are for the short-run objective: years of schooling. Though this is quite informative, it remains controversial since it fails to separate the effects of continued schooling from the characteristics which enable students to continue schooling. The schooling practices may reflect institutionalized responses to continued schooling rather than additional learning or altered behavior, and in any event do not identify which of the changes wrought by education are responsible for the reported productivity gains. Furthermore, these studies, as their authors well recognize, single out from the many continuing effects of education only those which have an effect on productivity. And when one goes to other long-range effects, controversy and ignorance compound. Aside from knowing that increased education correlates with higher voting participation, what do we know about the relation between the impact of schools on students and their participation in civic and political processes? And can we isolate among changes attributable to schools those which relate to future emotional or marital stability, abilities to derive satisfaction from leisure, and moral values?[5]

These are grossly phrased but important questions, and to some extent, questions amenable to analysis. They are also questions to which local analytical efforts are unlikely to yield answers. As a consequence, we would urge as part of a Federal analytical effort that research be directed at finding which different short-run objectives are most crucial to the achievement of a small set of generally accepted long-range objectives. The outcomes of such research would be of obvious value in the selection of short-range objectives which are the direct concerns of the schools.

In fact, the importance of well-documented priorities over short-run objectives is likely to grow significantly in the coming years as, under the pressures of performance contracting and improved effectiveness studies, we become more focused in our educational "production" efforts. In that new environment the cost of mis-stated short-run objectives and priorities over them will actually increase since we shall select among contractors and competing innovational pedagogies, and even whole schools, on the basis of their achievement of specified short-run objectives. Thus recognition of such cognitive objectives as reading skills, for example, to the neglect of such affective objectives as attitudes, appreciation and motivations might result in rejection of a program of education which had greater long-term impact in terms of income or emotional set.

Although one can seek to identify preferences over short-range objectives by finding the preference implications of the long-range objectives, it is apparent that people have direct preferences over short-range outcomes. It would thus be possible to direct educational policy at these short-run objectives; and given our very imperfect knowledge, it is apparent that these two procedures might lead to different policies. For example, parents who have a strong preference for their children's long-run economic prosperity could opt in the short-run for educational outcomes (specific vocational training, personality traits) which might be inconsistent with their long-range desires. There thus may be, de facto, a conflict between pursuit of *felt* preferences over long- and short-run goals.

But, if one is seriously concerned to serve the short-run objective preferences of the public, obvious institutional arrangements suggest themselves. Specifically, one should either structure school administration so that it is more responsive to the desires of parents, or alternatively, adopt the market directly and allow parents to select from among different schools pursuing varying objectives.

Such arrangements, as proponents of both greater community control and voucher plans emphasize, may assist directly in the achievement of given educational objectives by increasing parent and community involvement and respect for the schools, and by stimulating efficiency through competition. Against this must be set the fact, so heavily stressed in the literature on the economics of education, that many of education's impacts are external to the direct consumer (where the parent is assumed to act on his behalf). As a consequence, the preferences expressed through voucher purchases or community controls may imperfectly represent social preferences—though the significance of the neglect of external impacts may be mitigated by the fact that under community control or voucher plans the level of educational expenditure is determined in the larger political process.

Equity versus Efficiency Objectives

To this point we have proceeded as if there were no distributional issues in the setting of educational objectives. That is, though we have recognized the necessity for considering priorities over different learning objectives, we have ignored the need for setting priorities for the achievement of those objectives for different individuals. In terms of target groups classified by socioeconomic status or by the presence and nature of learning problems, do we focus our resources equally or disproportionately on the rich, the poor, the gifted, the retarded, the physically handicapped, and so on?

If we apply an efficiency objective to the setting of education distributional policy, we may well prescribe that, since the marginal learning yield and GNP increment per dollar of educational resource is highest for the bright child, education be channeled to the very intelligent young.

Such a view, however, conflicts with state constitutional guarantee of equality of educational opportunity, is based on overstated assertions, takes a narrow view of efficiency, and an incomplete perspective on income redistribution policy.

It is based on overstated assertions because to date the work on returns to education does not support the view that redistribution of education to high intelligence groups will bring significant efficiency gains. Furthermore, because the children of those with greater education are themselves more educable and more likely to avail themselves of the increased educational opportunities which stimulate future growth, present equality may be consistent with long-term efficiency. Finally, if society has income egalitarian preferences but does not like to redistribute income, it may prefer a lower growth rate if the future market income distribution is thereby made more equal. That is, even if it were inefficient (in a GNP sense *only*) to highly educate the less bright, it may pay to do so because a future desired income distribution pattern can thus be attained with less undesired direct income redistribution. These comments do not determine a set of education distribution objectives, but they do suggest that public preferences bear on distribution issues and that distribution and efficiency objectives need not conflict.

DEVELOPING OPTIONS FOR CHOICE

The recent introduction of educational program analysis as a part of planning-programming-budgeting systems has created potential procedural bias for the seeking out of options that offer some promise of paving the way for (a) new or better public product design, methods of production, and methods of delivery, and (b) assessment of such options.

The analytical process calls for the generation of alternatives —alternative programs, alternative methods, alternative levels within these programs or methods. While the analytical process does not insure that preferred programs will be adopted, it does provide a back-drop for requiring that new ideas be assessed, and fairly promptly.

The search for alternatives is a multi-phased effort in that essentially it keeps two processes separate—the generation of options, and the evaluation of them. The separation of idea generation, which can help formulate some options, from evaluation, which leads to other options, indicates parallel but necessarily coordinated activities directed to the generation and selection of options as part of the systematic analytical process.

Options and the Market Analog

Analysis is essentially a method of applying the concept of choice to the administrative planning sector. Given its origins, the analytical process tends implicitly to favor market-type approaches to administrative planning. Three market-type options can be identified, and each type illustrated by an example drawn from education. These market-type "solutions" are: (1) recording consumer preferences by representation and vote, (2) signaling consumer preferences by public prices, and (3) facilitating competitive production units and competitive markets.

The Recording of Consumer Preferences. The conceptual underpinning of cost-effectiveness analysis, drawing as it does on the market analog, tends to highlight consumer preferences and methods of registering those preferences. In the political or public sphere the usual record of preference is by vote and by other participation in the political process. Citizen participation, neighborhood elected councils, the neighborhood city hall, the neighborhood school, the vote on school bonds or for school boards are all approaches to bringing within the administrative planning sphere a closer count of the desires and preferences of the consumer by restricting the size of the group whose desires are being recorded.

Citizen participation, particularly participation of the poor, became an integral part of some programs, principally community action agencies under Office of Economic Oportunity auspices. The concept of a neighborhood school, in which the decision about schooling is determined by those who use the school, is in the spirit of the recording of the preferences of consumers. If parents are willing to, and attach sufficient priority to education, they, through the instrumentality of the school, can obtain the services they seek. More recently, the neighborhood school decision process has been extended to parental involvement in the school as an educational device both for parents and students. It has also been extended to schools as a component of the Model Cities program with the school performing in its role as an integral part of community development and the advance from poverty.

Price Signals. The usual method of signaling consumer preferences is by the price system. For prices applied in the public sector, we here use the caption "public prices." These public prices can record the preferences of families for education services and curriculum content. But application of price as an exclusive guide to resource allocation in education would be limited by external benefits and spillovers. These externalities force government intervention, lest the resources devoted to education be far less than would be efficient. Moreover, the large role assigned to education in the carrying out of an economic and political program of equality of opportunity points to substantial tax subsidization. Within the bounds of direct benefits received, however, the pricing system could be made to work so that by the payment of prices, families could select a menu of educational offerings that they consider appropriate to their requirements, especially by way of supplementary or extended school services. The fee or user charge is not unknown in education. It is used extensively for the financing of school lunches, and in many places for school books and summer school activities. The large supplementary sector to public education in private educational offerings, both full-time school and activities such as music, art, dancing, are financed through prices paid.

Competitive Market Creation. The creation of a competitive market in education has a long record of advocacy in some quarters. The most important of these proposals was that advanced by Milton Friedman, based on the hypothesis that consumers of education should be given a choice about the kinds of educational services provided. More specifically, his plan proposes the creation of a voucher system by which vouchers would go to each family on behalf of their school-age children in a sum to be spent exclusively on educational services of their selection, within standards set by the state government on minimum acceptable services. The voucher system has in recent days taken on new importance as the Office of Economic Opportunity has undertaken experimentation with such a system as an option to the present local public school monopoly structure.

It is not the intent here to analyze each of these market-type measures, but rather to illustrate that within an analytical framework that seeks to apply economic analysis of choice to public service problems (through administrative planning processes), various types of new approaches are involved that draw on micro-economic concepts.

Types of Choices

The brief discussion of market-type options which are brought to the fore through the use of analytical tools presents one facet of the question-raising proclivities of the analytical process.

The processes of program analysis call for a search for alternatives that can better contribute to new public products, new methods of generating such products, and new methods of delivering them. In understanding the generation of options within a program analysis, it is important to classify program options according to the point of origin. Three general classes of alternatives can be identified when optional choices are grouped according to their method of formulation. These types of options are (1) the derived option, (2) the option in the public domain, and (3) the inventive option.

Derived Option. The derived option essentially comes about through the logical processes of question raising within an analytical framework. By the identification of the components or behavioral sectors that are involved in a public service problem, we can begin to inquire about possible changes in ongoing practices with respect to each component that would gain a larger measure of program effectiveness. For example, what changes can be put into practice about the components of a basic model of the educational system? Suppose for example, that the educational problem under study involves each of the major actors whose behavior patterns affect the learning achievements of children. These actors, we assume for purposes of illustration, are (1) the community, (2) the school administrators, (3) the teachers and more specific school inputs, (4) the parents, (5) the children and their special characteristics. The process of deriving the program options is essentially an inquiry about what it is feasible to do about (1) the community, (2) the school administration, (3) the teachers, and so on, in order to improve learning output. Clearly there are a wide range of program possibilities that could be generated, and for any of the possibilities there are different levels of activities that could be applied.

The derived option, as is indicated, is generated by identification and inquiry about the components of the system. The logic of the analytic processes and the range of materials assembled to quantify the possible effects of various solutions may generate additional program options, or additional methods of production or delivery of educational services. Let us assume that the findings point to the effect of neighborhood appearance on motivations to learn. It would then follow that a range of program options might be generated addressed to methods of improving the appearance of the community. Or, if study findings point to the importance of the motivation of the parent in motivating the child to learn, the program options move back from program content directed toward improving the motivation of the child to methods of motivating the parents to motivate the children.

Still another set of program options stem from the assessment of program activities or the assessment of program costs and the logical sequence of variation in levels of programs. Examples of these are many. Measured effectiveness of an existing program or activity may suggest the dropping of one option and the substitution of another. For example, if it is found on assessment of Head Start that in primary grades any additional pupil learning gained is not long retained, one option becomes a continuation of an educational activity into the primary grades to retain and build on the gain made in pupil learning. The Follow-Through program option was essentially derived in this way after evaluations of the progress of Head Start toward the objective of learning achievements.

Important, too, is the range of program possibilities that call for variations in levels—changes in number of hours of schooling, for example, a longer day, shorter day, part days; various combinations of hours of school activities; various lengths of school years. These variations in school hours, school days, or school years can be considered for all children, for some grades or age groups, for some types of school programs. If one identifies the options, and asks in an approximate way about the consequences of essentially different groups or levels of activity, one begins to understand the kinds of program options that would make a difference in program effectiveness and cost.

Similarly, assessment of program costs may suggest less expensive methods of pursuing the program purpose. And at a lower level of program generation, optional resource inputs might be examined—for example, various combinations of class size per experienced teacher, or class size per experienced teacher plus teaching machine equipment use, or class size per teacher plus one or two teacher aides. Structuring the options to assess optimal resource choices within a given educational program is a problem of reasoning about the range of feasible optional levels that would permit a later examination of relative costs and relative gains.

Illustrations of Educational Program Sequence and Timing.

An important range of program options concern the number of years of schooling, with each option designed to produce (1) added school graduates, (2) improved work experience, (3) higher earnings, and (4) improved learning achievements.

Several school programs that have been developed have optional combinations of 12 years of schooling as follows:

8	6	4	3
	3	4	5
4	3	4	4

Other technical possibilities exist. What is the critical input difference among these possibilities that has potentially an important bearing on the outputs? The critical resource input difference is the peer group or classmate characteristics. If the change in resource input is specifically related to the output changes, the question arises: Would more or less output result by altering the peer group mixes of children in schools?

Further, is 12 years an optimum number of years to complete the learning required? Should the number of years be more or less than 12? We have not always had a 12-year program of education starting with the first grade level. In some places the twelfth year was added within the last several decades. Can the years of schooling prior to graduation from high school be reduced? There is a prior question: Should there be a difference in numbers of years of schooling for those undertaking a pre-college study program than there is for those who on completion of high school would enter the labor force? What are the implications of program choices in such a decision in the school system? Or stated differently, what are the output consequences of this type of decision? And, in any case, if there is to be such a separation, at what age?

The 12 years of schooling is combined with a given length of school year, usually 180 days. What if the school year duration were to be extended, as many have proposed, either (a) on a student-option basis, or (b) as a matter of regular program design? And should there be a difference in period for children at different ages? Could the equivalent number of years be continued and an earlier school termination age made operational or effective (that is, would there be more or less output in terms of the criteria of added school graduates, improved work experience, higher earnings, improved learning achievement)?

If the students leave school on completion at an earlier age than is now customary, will there be jobs or adequate maturity for a college program of study? These questions bring into focus a whole new set of issues—issues that concern the labor force and skill experience requirements on the one hand, and requirements for college study on the other.

Fritz Machlup proposed some years ago that the number of years of schooling be reduced as a way to lower the cost of education. More recently Edward Banfield wrote "Since the schools are not teaching much to many children after ninth grade, it would make sense to give a diploma on completion of ninth grade and lower the school leaving age to 14." But the Banfield proposal is restricted only to nonlearners and would permit others to continue in secondary school who are able and willing to learn. He notes parenthetically in making his suggestion that " . . . in a society in which increasing numbers of students do finish high school, *some* stigma for those who do not is inescapable."

As an option in terms of length of schooling and age of termination, it is important to note the criteria that Banfield uses in making the proposal: (1) to prevent further injury to the nonlearners' self respect and perception of the institutions of society; (2) to improve the opportunities and incentives for learning of the early leavers by training on the job; and (3) to improve the learning climate and possibilities in the classroom for those children who remain in school.

One could presumably redefine the Banfield arguments into operational criteria and carry out some experimentation and testing to determine whether the options, as he defines them, are more or less effective than other alternatives, accepting his criteria amended only to be operational in quantitative terms.

Banfield recognizes in his proposal that its effectiveness is contingent on the labor force possibilities for the young persons who receive diplomas at an early age. He argues, however, that if the schools were limited to their proper business, institutions might be developed to meet the needs of those boys and girls who are too old to learn but too young to work.

Other options can be designed that would make more explicit (1) the costs of a dual system—that is, one system for those who are not continuing on to college, and another for those who are, and (2) the incentives, or subsidy price of incentives, necessary to cause industry to make provision for early entrants into the work force and to provide upward job mobility. Such upward mobility might be sought through (1) on-the-job training, (2) job training and vocational skill development, (3) work-release time for formal skill development, and so forth.

It would be possible to formulate options on high school education that view such education not as preparatory to college but as part of the continuous advance in learning, living, and working for all children. As one possibility an educational system could be developed with university training not as preparatory to work but as part of the occupational process, or as a program for adults, not youth. Such a system could provide a continuum of education for those who elect education beyond the high school that calls for and permits episodes of education during the life span for those whose professional and technical occupational desires require such education and training.

It might be found on a very crude assessment of options beginning with the first grade and kindergarten that educational achievement is set at ages below the age of 5 or 6, and that no coordinated spelling out of options for a sequential pattern of education can start so late in the child's development cycle and yield important learning outputs.

Is educational achievement dependent on the child's development and learning in the first years of life? What are the options for beginning of the sequence of education throughout life? Can the two years of formal schooling during the present 12 years be converted, as it were, to two early years of preschool child development? Or, should those years be converted to four half-years of preprimary schooling? And so the process continues of a formulation of options through the range of possibilities.

The basic intent of this formulation of options is to suggest something of the process by which some of the components that are descriptive of the system could be turned about, expanded, contracted, or otherwise altered to purposively generate alternatives for choice.

More specifically, as a set of interrelated options for educational redesign, it would be possible to:

1. Reduce, the numbers of grades of elementary and secondary education from, for example, 12 to 10 years, eliminating some of the repetitive content in some grades within the existing school program.
2. Call for high school graduation for all young persons at age 16, or approximately both the terminal age of compulsory schooling and the age of eligibility for work permits under existing law in many states. (This type of tie between school completion, years of compulsory schooling, and work eligibility age would mean the elimination by definition of the school dropout. Each child able to attend school would be graduated. It would permit work for those young persons who were willing to take on immediate employment.)
3. Set up incentives for employment for youth. (Various incentive options would need to be explored, but among them would be subsidized pay, elimination of payroll tax requirements, both federal and state, for the youthful worker, which would amount to about a 5-6 percent subsidy incentive for the recruitment of young persons.)
4. Establish educational programs that would give some promise of advance in skills and earnings for the young persons —for example, application of job-advance training programs of industry, combined industry-educational institution programs such as the British sandwich courses, government subsidization of release time for educational programs.
5. Establish an institutional arrangement that would facili-

tate and permit advanced education beyond the high school for those in the adult population, so that such education is open to persons at any age who are willing to undertake such study either as post-university refreshers, or as first-degree credit study programs. Such arrangements can be made by either a loan program that would permit adults to borrow on liberal terms against their future higher earnings, or make their own investment in higher earnings in the future. Or the same type of income guarantee during adult study may be made available by broadening the social insurance program to provide insurance against the risk of educational obsolescence and job stagnation of those who cannot qualify for job advancement except by advanced education or training. A number of optional methods can be formulated to make more specific the notion of professional and technical education for adults in midstream in place of a continuous lengthening of the years of schooling prior to labor force entrance.

6. Build an educational program that is designed for adults seeking out college and university education, together with the financial incentives required for such rearranging of the institutions of higher education.

Option in the Public Domain. The second type of option, the program or program proposal in the public domain, is one that is defined here to include options that have been presented as a consequence of university or other research, or has been applied earlier in private industries, by other agencies, or by other governments. Proposals that are advanced through a variety of sources become ready-made options for review of ongoing activities or programs or extensions.

The search for alternatives in the public domain requires a systematic collection of information about experiments and demonstrations that have been carried out that can provide information about program options in the public domain. Other services are needed, such as options formerly advanced at some earlier period, review of the literature and research completed bearing on specific problems, especially the recommendations that are made, and also practices and policies in other governments, both domestic and foreign.

The ideas originating in proposals and programs already in the public domain include more specifically: (1) legislative and administrative proposals advanced earlier; (2) research findings in university and other studies; (3) programs and policies in effect in other governments, either the United States or elsewhere; (4) demonstrations and experimental program findings.

In the above discussion of the derived option, a set of interrelated activities that make up a package for educational redesign was set forth. Reference was made to the findings of academic studies such as that of Fritz Machlup, or to the experience of other nations in providing educational services, such as the heatedly debated sixth form in England. These are illustrative of the public domain type of option.

The New Idea. A third type of option is the inventive option, or the new idea, of the application or adaptation to new purposes of an old idea. To gain the new idea as a program option (or set of options) requires a deliberate buttressing of the analytical process for inventive work and the research supplement to such invention. For years there has been much discussion of social inventions and the need for support to provide inventiveness. What we are basically seeking as options for subsequent assessment are:

new concepts in carrying out present programs,
new tools for carrying out present programs,
new ideas for serving the public better,
new ideas for serving the public more economically,
new ideas for serving the public with more certainty.

These processes can also apply university and other agency and community studies already completed to the task of generating better and more efficient public products and accelerating innovation.

The relationship between research, program analysis, and idea generation can be illustrated in two ways,[6] as shown in Figure 11-2.

The wheel flow depicts interaction between functions as being channeled through the executive. The circle flow describes a direct interaction between each functional aspect of the communication network.

COSTING THE CHOICES

Specification of the options sets the stage for the subsequent analysis of costs and of program effectiveness and the comparing of costs and effectiveness. The information that needs to be brought together is at three levels:

1. Costs and effectiveness in a given current period for each level of the program
2. Future costs and effectiveness implications of the present program and the alternatives for each of the levels of the program option
3. Changes in costs and effectiveness that accompany changes in level of volume or quality of services provided, both current and future.

The questions that require costing and effectiveness measurements are not exclusively the usual global ones that have been the traditional concern of those who have studied education as an investment, or as a source of economic growth. It is not only the number of years of schooling that is at issue when analytical studies are undertaken.

The range of issues is wide and includes such initial questions as:

Should the number of pupils per class be 25 or 30?

Should teacher aides be introduced, and in what ratio to experienced teachers?

Should the time of teaching be reallocated, with heavier emphasis on reading skills?

Should team-teaching be introduced, and at what grades?

Should teachers be given a flexible use of limited funds for the purchase of materials in the classroom?

Should the hours of schooling be increased by after-school programs?

Should a school breakfast program be undertaken?

Should educational television be used, or teaching machines, or computerized instructional aids?

What additions should be made to school plant in the district, and where should the school be located?

What types of parental education programs should be undertaken?

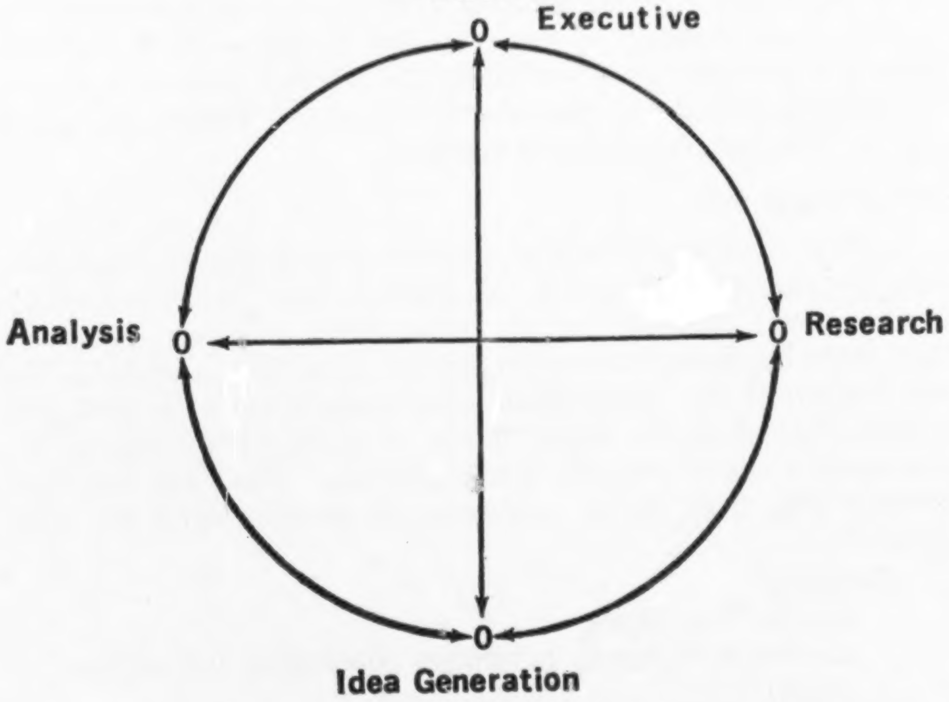
Should the pre-primary program be limited to morning hours?

We have enumerated some illustrative questions here in the format of the way the queries are usually put to suggest the order of the questions for which costs need to be gathered in terms of the specifics of the schools or school district involved and for the purpose and the program options that are generated to relate to the underlying purpose of the query.

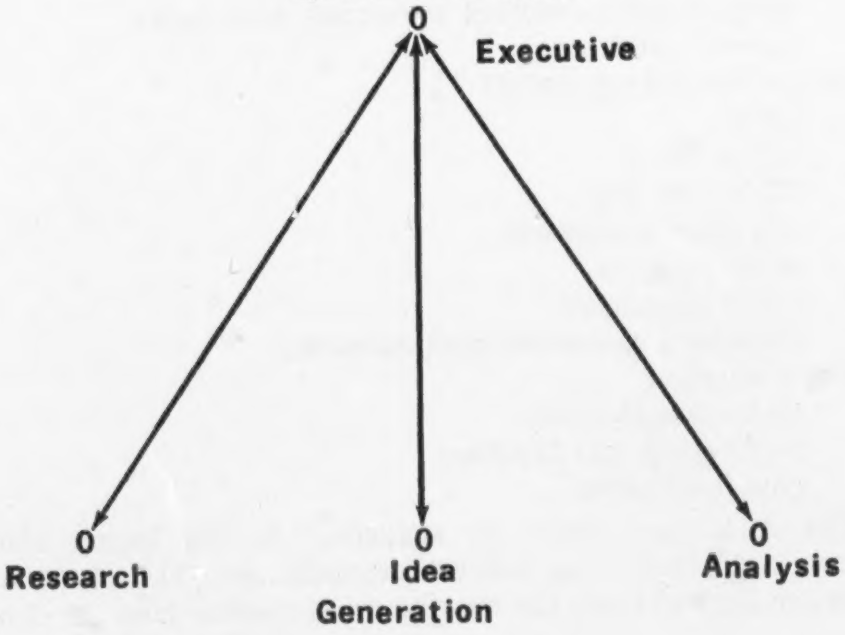
Fig. 11-2

Research, Program Analysis and Idea Generation

Circle


0 Executive
Analysis 0
0 Research
0
Idea Generation

Spokes of a Wheel


0 Executive
0
Research
0
Idea Generation
0
Analysis

For costing purposes we need to know the total estimated cost of each program alternative that is being considered, both initial cost and costs that are implicit for the future at the levels of services being assessed. For example, the current levels of provision of pre-primary services would have to be priced out for the changing number of pre-schoolers at the several optional ages, and services for a half-day or a full-day session, both for the present number of pre-schoolers at the different age levels and for the changing number expected.

Cost Components

Cost is considered, for the purposes of cost analysis, to represent the monetary valuations of real resources that are used up in the course of producing the educational services—resources that could be devoted to other optional uses. The variables that are important for quantifying cost components of educational options depend on the identification of those components in the aggregate flows of the educational system. What are the components that need to be considered at various levels for each option?

- Manpower
  - teacher man hours
  - student man hours (available potentially for alternative use)
  - administrative man hours
  - nonprofessional school personnel man hours
  - parent man hours
- Materials and equipment
  - texts
  - audio-visual
  - lab equipment
  - computer equipment
  - other supplies
  - other equipment
  - nonschool equipment and materials
- Physical plant
  - instructional space
  - other space and facilities
  - nonschool plant

The cost components, as suggested in the listing above, include both direct and indirect expenditures. The direct cost items are derived from the man hours of teacher time or administrative time by determining the numbers of hours and the salary costs essentially per hour. The expenditures to be related to the man hours represent not only salary costs, but fringe benefits costs as well, where appropriate—that is, retirement pay, health insurance, sick leave pay, and vacation pay.

Purchases of equipment and materials need also to be included. There are the direct outlays of equipment and materials per man hour of teaching time or other unit bases, and the less direct equipment costs required for administration and other uses. The price per unit of equipment or materials and the numbers of such equipment in use can be calculated at different levels of man hours of teaching time, or per school year, or per student.

Costs need to be computed for the first year and for subsequent years, discounted to the present in terms of appropriate discount rate and numbers of years of use ahead in a sufficient period to show on a comparable basis the cost of a range of options.

The techniques of cost calculation necessarily have to reflect the changing prices for a period ahead, and, for personnel, competitive salary levels at different prices. What we essentially have is a unit item of measurement, for example, man hour of teaching time, the cost for competitive wage level per unit of time, some type of estimating procedure which can establish the relationship between the numbers of pupils for the instructional period involved (length of school day, week, and year) to the numbers of units of teaching time required, and a basis for weighting the cost per unit to some aggregate base.

Because of differences in regional markets for teachers and possibilities of experimentation with levels of pay by skill specialization, by quality, and so on, different alternative cost computations can be made to show the effect of such differences in pay procedures on future costs.

Direct Costs. For costing purposes we need to know the total estimated cost of each program alternative that is being considered, both initial cost and expenditures that are implicit for the future at the levels of services being examined. For example, the current level of provision of kindergarten services would have to be priced out for the changing number of 5-year-olds and kindergarten services for a half-day session and for a full-day session, both for the present number of 5-year-olds and the changing number expected.

Total costs include expenditures for personnel, such as salaries and wages and fringe benefits. They include directly identified costs associated with an activity and that part of overhead that appropriately may be assigned to it. Building costs, equipment costs, and supplies that would be involved in the various program alternatives would be estimated, whether borne by the schools or by some other agency. Costs borne by general revenues of the jurisdiction would be identified as well as costs borne by grants and by other taxing jurisdictions.

We also need to know, however, which costs involved in the activity being considered are fixed and accordingly would not change because of changes in level of activity and which costs are variable (i.e., costs that respond to alternations in quantity or quality of service). Such a separation provides the base for estimation of how costs would be modified, or what the marginal cost effect would be, by greater or lesser production of the services.

The work that has been done over the years in developing the manual for educational accounts and the use of such accounts by the U. S. Office of Education for statistical reporting provide an important take-off point for most analyses. However, expenditure accounts specified in the manual do not necessarily yield the total cost data needed for examining in depth the cost of particular optional activities. However, it is not necessary that accounting records and definitions be revised. It would be sufficient to prorate expenditures as recorded for accounting purposes to derive cost estimates. These prorations can be made in accord with reasonable allocation indexes designed to allocate expenditures among purposes. While this procedure would lack the precision of detailed accounts, it would provide adequate information for program analyses. Margins of error are tolerable. The major consideration is whether, in arraying alternative methods of getting a task done, the figures are comparable from program option to program option.

Indirect Cost Items. Two major indirect costs are listed in the enumeration presented earlier. These are student man hours and parent man hours. Essentially these man hours represent the hourly base for the computation of income foregone or income which would be earned during the period in which the student and parent engage in the education of the child.

A combination of forces, both institutional and physical, make for relatively low earnings potential for students at secondary school age. We assume here that earnings foregone as a cost of education could be counted beginning with age 14. Optionally, earnings foregone can be restricted to perhaps time lost from work from 16 years of age and over. As suggested earlier, Professor Machlup, some years ago, proposed that the school-leaving age in general be lowered as a way of reducing the costs of education, particularly of earnings foregone. Professor Machlup suggested in his system that what is now learned in 12 years can be learned in 8. "Most people can learn what they ever learn in school in 8 years, and if they are kept there for 10, 12, 14, or 16 years, they will merely learn more slowly." The age at which to start computations of indirect costs might be selected in terms of the age of actual entrance into the labor force, or the age at which there is legal access to earnings. The optional structuring of education we described earlier suggests that for some types of program options, foregone student earnings could be counted beginning at age 16.

As one moves up the educational levels, the costs of pupil participation in the educational process by the man hours spent in such educational processes and, accordingly, the time foregone from optional productive employment, become more important in the total costs of education.

Costs of income foregone have been discussed at considerable length in the economic literature. The notion of costs of parental time in motivating and educating children has not been considered heretofore,[7] and for this reason the concept and problems of estimation are discussed at what otherwise might appear to be an unbalanced length.

The concept of parental time spent in motivating children to learn and in helping them with the learning is fairly plain—so much so that it is difficult to understand the earlier neglect of the cost of parental time. When parents spend time with their children, that time has an opportunity cost either in leisure pursuits or work time foregone. Time spent in child motivation and development is in largest measure the time of the mother. It is in some part (that undoubtedly varies by family characteristics) time that would otherwise be available for paid work force participation by the mother. But "father time" also is of importance to the motivation of the child, even if the time thus spent involves an optional use of leisure; that is, the time spent does not call for, or involve, any loss in hours spent in gainful employment. Thus we have two rather different situations: (a) the contribution of the parent (primarily the mother) motivating and educating the child—a contribution that calls for giving up or foregoing participation in the work force, and (b) the contribution of parental time that would otherwise be spent on leisure activities—a contribution to an educational do-it-yourself type of activity. We would view the results of this contribution as an improvement in a capital good, the educational capital in the child.

The measurements that are needed to capture the indirect costs are thus of two types. In the case of earnings foregone, the conceptual work that has been with regard to costs of student earnings foregone can be applied. The task is primarily one of approximating the number of hours spent in the pursuit of child motivation and education, then of converting such hours into standard work weeks, and further pricing out the work weeks at marginal wages or earning rates. In the second type of case, in which the parental contribution is made without loss of earnings, the time spent can be treated in much the same way as a do-it-yourself activity that results in a capital type good with a continuing or long-term yield. In this case the task of estimation would be one of setting a value on the labor time in terms of the contribution to the product produced. When a man builds a house with his own labor, or adds a room, the contribution that he makes is some value of labor time that would have had to be purchased in the market (appropriately corrected for production errors of the unskilled on the one hand, and for the tender loving care of the owner, on the other).

The input—parental involvement through time spent in the education of the child—and the value of that involvement have important distributional aspects. To clarify the type of distributional issues involved one might portray at the one extreme the case of the female head of the household whose work takes her away from her child on a portal-to-portal basis for, as an example, 10 hours a day. The time she has for her child is limited and the opportunity wage of that time would in many cases tend to be low for the undereducated poor. The value of the labor time of a female household head with little education to the education of her child tends to be low. Thus, the cost of parental involvement in this instance would be small. The contrasting case is that of the paid parent substitute in the form of a child companion-tutor. For most of the cases that lie in between, a mother spends a part of her time on child development activities, and the father's involvement in the education of his child does not cause him to forego his usual work week; but nevertheless he makes a contribution to the educational product of his child and the labor time he spends has a value.

Explicit recognition of the costs of parental involvement has important policy implications. Program options and resource tradeoffs more explicitly would take account of the possibilities of use of parental time (or labor product) or use of other resources. At an earlier time in history, parents joined together to build the schoolhouse; they arrived at some collective decision about the housing of the teacher that would trade real goods for teacher time in place of market goods. In the complex economy of today we still have the options of parental time or market purchased resources. Parent time (and labor product) for example are not always spent inside the family. The parent volunteer in the school is one illustration of the parent providing services for the entire school. Or, the parent volunteer may be engaged in selected child and youth activities that provide work time (or labor product) for perhaps a smaller group of children. The largest opportunity cost in parental involvement (probably), however, is the cost of the work foregone and labor product spent in the family setting.

We also now have set a somewhat different framework of cost analysis within which to view equality of resource inputs and educational outcome. Variations in costs (including the cost of parental time and labor product) would be expected to result in differences in educational opportunities, or outputs. The child whose parents have low dollar-earning capacity and thus low opportunity cost of involvement in education would have a smaller resource base behind his education than a child whose parents have a high earning capacity. Furthermore, the motivational and educational product donated as it were to the school system is greater, surveys indicate, for the parent with substantial number of years of schooling than it is for the parent with little education. Equality of resource inputs would require a compensation for the different contributions of parents. Essentially the compensatory educational programs have this type of analytical framework, but it has not been made explicit in terms of compensation because of cost differentials. More specifically, it needs to be emphasized that even if expenditures per pupil were the same in a community whose family heads generally had few years of schooling as they were in a community with family heads who had completed college, the real resource inputs would be different and the potential outcome could be expected to be different. Lower outputs may be anticipated where the inputs are in fact lower. Equality of resource inputs would necessitate measurement of the value of parental involvement of the two types, work time foregone and the do-it-yourself capital investment to which we have given the short label of labor product.

Further, the notion of work time foregone by the mother as a cost of elementary and secondary education alters significantly the subsequent understanding of returns to higher education of the woman. The returns to such education of the woman who chooses on graduation from the university to stay at home and raise her family is derived from the saving she creates in the course of elementary and secondary education. We might look in part, as a matter of fact, to the growing employment of women for an explanation as to why the added public cost for such schooling is not apparently contributing as much as could be expected to improved educational achievement levels. Part of the prior costs of schooling incurred by the mother are now in a sense monetized in the costs of public education.

The type of indirect costs we have described assigns to the school program the value of earnings foregone by women in their performance of their function as a resource input to the school. Some mothers, it must be recognized, take on teacher assignments in the school on a pay basis; some choose volunteer activities on behalf of education; and some confine their activities to their own families, or they do these things in some combination. Costs, as typically measured now, exclude the educational activities in the home. The value of volunteer services, moreover, is in most places within the educational establishment not costed; but in the closely related function of health care, volunteer activities are counted as costs.

Valuation of parental involvement presents a measurement problem that requires substantial research. But when completed, the measurement would yield a yardstick for judging changes in input over time in relation to outputs and equality of resource inputs that has been lacking.

Program Interaction and Costs

Another set of costs can be counted in one of two ways—either as a component of effectiveness of the several options, or as a cost item, whether positive or negative. Various types of educational activities at different levels have their impact on public expenditures of the nation, state, and community, and also on private consumption outlays. For the moment we are considering the impact of program on public expenditures. Higher educational achievement levels, for example, can reduce the cost of processing members of the armed services. The fewer draftees, for example, rejected on account of low educational achievement, the less wastage is involved in the processing procedures. Similarly, and perhaps more importantly, higher educational achievement levels may produce improved rates of nondelinquent behavior and accordingly lower public costs associated with delinquencies. Or, higher educational achievement levels may produce more awareness of health protection and thus lower the resources used in medical care. The number of instances of interaction between educational outputs and other outputs are many. Accordingly, the cost relationships are complex, even when limited to the public sector outlays, and often involve two or more different levels of governmental activities.

Optional methods of dealing with such cost items, positive or negative, suggest themselves. One could restrict the count of cost reduction to the costs of a single agency (for example, the educational agency). If improved education achievement levels, for example, produce more satisfactory use of *the school* and result in greater retention (lowered rates of attrition), there are savings in the administration of school absences and school grade repetition or dropouts that could be counted as an offset to the costs incurred by those programs that are designed to improve the achievement levels. If the cost reduction is not an agency cost item, it could be omitted from the cost calculation. Or, optionally, such cost reductions could be deducted from other costs within a single unit of government or a single jurisdiction that has authority to tax and spend. Interagency impacts thus would be counted as costs, positive or negative. The optional method of dealing with such secondary impacts or outputs is to include the cost saving as a criteria or measure of effectiveness.

MEASUREMENT OF BENEFITS AND EFFECTIVENESS

In this section we deal with the measurement of benefits and of effectiveness.

The Economic Measurement

Economic analyses of program results often are made in comparable monetary values. The reason for measuring program gain in this way is plain. Comparisons can be made among program options in a uniform way. And gains from two or more options can be related to costs in terms of relative rates of investment return, for example.

Much of the conceptual work on education in the past, relevant to the current analytical studies, dealt with such concepts as:

1. Education as an investment in people, or as a capital investment with valuation possible both in terms of original cost or future earnings power.
2. Education as a source of economic growth (as an important explanatory variable in the residual factor in national growth rates).

Both of these approaches involved determination of earnings differentials attributable to years (or quality) of education. Both suggested a factoring out of basic or "native" ability (without due regard to the creation of ability by education).

Differences in earnings attributable to differences in schooling, moreover, at least in human capital investment theory, necessitated a determination of work-life earnings at current value. A range of possible estimation procedures has been formulated, both as to years of working life, future productivity trend adjustments, and discount rates. For purposes of growth analysis, labor contributions to gross national product are approximated with a number of detailed assumptions as to the stability of shares of product received by the several factors of production, and also as to the employment market generally.

Essentially the measurements developed in the earlier conceptual work are of a macro type and do not lend themselves readily to the micro problems of comparing results from activity options for a school district or school.

Current Objectives and Measurements of Progress

While economic analysis tends to favor the long-run measure of income increments attributable to additional education, as we have indicated earlier, measures of program achievement need to be commensurate, or almost so, with the objectives that have been formulated, and sufficiently comprehensive to capture the short-run as well as the longer run results. The use of criteria of program results that depart from monetary measures is also suggested by the attributes of the discounting procedure for estimating current values of future earnings streams. High market interest rates point to high discount rates—and at the high rates, current values of earnings streams delayed for many years by early childhood education or protracted years of schooling amount to very little compared to programs for the adult population of working age.

Sometimes it is argued that the estimates of current value of future earnings as a measured result obscure, for the policy official, many hard decisions that were made or assumptions that were formulated in the course of carrying out the analysis. Among the factors that are often "buried" in the estimation procedures are (1) distributions of earnings among persons with the same number of years or quality of schooling, (2) the impact of a discount rate selected on the figures derived, (3) the impact of productivity changes assumed for persons at each of the levels of education, and so forth.

The yardstick "future earnings," too, is dependent on factors other than schooling itself, so that the estimates could become increasingly inadequate as a guide to policy decisions.

Achievement Test Scores

At the opposite extreme in terms of the time schedule appropriate for program assessment are those effectiveness measures which relate to objectives termed "short-range" above. Prominent among these are achievement tests which measure reading, quantitative, and other skills.

But in light of a productivity or other long-range objective, it is apparent that these are not enough. Performances of students on achievement tests do not enable accurate prediction of student future economic productivity or other characteristics. A number of different measures relating to students' motivation, self-image, attitudes, vocational expectations, and so on are available which, because they reflect characteristics of strong future influence, might usefully supplement achievement tests as measures of effectiveness in meeting meaningful short-term objectives. In addition, a number of less methodologically sophisticated but useful measures are available to better inform school personnel on the degree to which they are effective in achieving a host of short-range objectives. As an example of these, consider a sampling of indicators catalogued by one of the authors in another work.[8] (Illustration 1)

ILLUSTRATION 1

ILLUSTRATIVE PROGRAM OBJECTIVES AND OUTPUT INDICATORS

To develop human learning capability	Number of young persons receiving educational services Results of achievement progress testing Results of measures of attitude
Sequential development of independent and self-sufficient persons, through educational levels	Percent of persons equipped for independent living Number not dependent on public or private charity Number employed, attending college, etc.
To prepare the individual for self-sufficiency	
To develop strength and coordination and to provide an outlet for physical energy	Number and percent of children participating in physical education Number and percent of children meeting specified physical standards
To reduce health impediments to self-sufficiency and learning and to provide knowledge of detriments to health and physical well being	Number and percent of children with standard specified health habits, e.g., tooth brushing Number and percent of children with knowledge about effects of tobacco, alcohol, and narcotics Number and percent of children receiving sex education and knowledge of family planning
To develop the general skills that are preconditions for employment	Achievement test scores: overall Number and percent at grade level Number and percent exceeding grade level Reduction in the percent not achieving at grade level
To develop capacity for communication and intellectual advance	Achievement test scores: reading, spelling, and expression Number and percent at grade level Number and percent exceeding grade level Reduction in the percent not achieving at grade level
To develop capacity to deal with numbers and symbols in daily and work life	Achievement test scores: Number and percent at grade level Number and percent exceeding grade level Reduction in the percent not achieving at grade level
To develop capacity for solving practical problems, for interpreting instructions, and for stimulating reasoning	Achievement test scores: Number and percent at grade level Number and percent exceeding grade level

	Reduction in the percent not achieving at grade level
To prepare the individual for specific employment	Skills achievement tests: Number and percent of graduates having skill level Number and percent exceeding skill level Reduction in the percent not achieving at skill level.
To prepare the individual for specific employment	Number of dropouts Number of graduates Percent in jobs after a certain period of time Percent enrolled in colleges and universities
To transmit society's fundamental values in order to facilitate group living	Crime rates Juvenile delinquency rates Divorce rates Births to unwed mothers Indicators of tolerance of minority groups, religious and race differences Voluntary compliance with specific public programs
To transmit concepts of family living	Sociometric indicators Percent participating in specific homemaker programs
To transmit moral precepts and concepts of group participation	Percent participating in youth activity groups Percent holding prevailing moral beliefs Percent acting in accord with prevailing social and moral precepts Changes in age-specific crime rates Number and percent participating in extracurricular school activities Number and percent participating in organized recreational and sports activities Number and percent participating in community outdoor and other recreational activities
To develop a knowledge and appreciation of the societal environment and how to participate in it	Achievement test scores in social sciences Number and percent at grade level Number and percent exceeding grade level Reduction in the percent not achieving at grade level Percent of student body voting in school elections Reduction in the number of offenders and of recidivists Change in delinquency rates
To achieve awareness of the range of human endeavor and gain full self-realization	Attitudes toward "self" and tests of information
To achieve an awareness of the range of human endeavor and its development	Measured knowledge of a variety of disciplines
To achieve an awareness of politi-	Measured knowledge of history

cal, cultural, and social development	
To achieve an awareness of political, cultural, and social development	Measured knowledge of social geography
To achieve an awareness and understanding of arts and music	Measured knowledge of arts and music
To draw out and broaden individual capacity and talents	Number and percent participating in intellectual activities
To ferret out and develop talent in the arts	Number and percent participating in art activities Measured achievements relative to aptitudes Number of prizes and awards
To ferret out and develop facility in foreign language	Number and percent participating in foreign language Measured achievements relative to aptitudes Number of prizes and awards
To ferret out and develop ability in science	Number and percent participating in intermediate and advanced sciences Number and percent participating in advanced mathematics Measured achievements relative to aptitudes Number of prizes and awards
To ferret out and develop ability in other special programs	Number and percent participating in intermediate and advanced humanities and social science
To make programs selectively available in terms of child's interest and capability	Measured achievements relative to aptitudes Number of prizes and awards
To ferret out and develop athletic ability	Number and percent participating Measured achievements relative to aptitudes Number of prizes and awards
(To develop leadership talents)	Number and percent participating Measured achievements relative to aptitudes Number of prizes and awards
To provide information and aid to the individual and his parents to permit better choice of school program and of post-high-school opportunity that accords with capabilities	Percent of students using services Percent of families aided Change in separations and divorces Change in school performance of child Percent of graduates admitted to college Percent of graduates continuing for a complete college program

The Place of Effectiveness Measures in a Market-Oriented Educational System

Here we must consider two options. The operation of the market might be simulated through the influence of felt preferences over short- or long-range objectives and the design of schools to meet these preferences. Or the market might instead be implemented directly in the provision of educational services. The place of effectiveness measures in the former case is clear, for without them it would be impossible to gauge the extent to which the desired objectives were being achieved. In the latter case, however, it might be argued that there is no room or need for effectiveness measures. Selection of the market mode, in this view, implies a decision to abide with consumer choices.

Though logically correct, this view ignores the possibility and desirability of facilitating informed consumer choices which focus on nonsuperficial characteristics of the schools. Though many complaints leveled at schools relate to significant educational failings, it also is probably true that parental views concerning the quality of different schools are based largely on clientele rather than school characteristics.[9] A valuable adjunct therefore to any broad implementation of a voucher system would be a publicly produced kind of Consumer Reports which would provide information on school effectiveness in achieving selected objectives. The document would certainly not be universally read, but the information it contained would likely penetrate communities, and could provide a very important supplement to direct parental and student impressions and observations. As in the selection of objectives, it would be important to include a broad range of effectiveness information to facilitate a balanced appraisal of schools which are varyingly effective in meeting different objectives.

Though movement to a voucher system might bring many of the salutary effects, its proponents claim that the complexity of the product and its effects, and consumer ignorance, give rise to the danger that educationally irrelevant tastes might be catered to. The availability of objective information, of the type an analyst would like, might significantly lessen that danger. At the same time, the difficulty of separating school from student or environment, which complicates educational analysis generally, raises its own dangers in the application of effectiveness measures to the informing of consumers.

THE SETTING

Economic analysis applied to education policies has certain start-up characteristics.

Information about production functions that would facilitate the estimation of the outcome for differing inputs is lacking, or inadequate. Accordingly, the first steps in economic analysis have been addressed to regrouping existing data, or designing new experiments that could throw some light on the problem to gain insight on outputs produced by specified inputs. Basic questions about the output "learning" have been given new emphasis—such questions as: How is learning achieved? How does learning take place? What sparks it, nutures it? A better understanding of the learning processes, both in general and differentiated for groups becomes a part of understanding appropriate combinations of resource input (other than child or parent) with variations in the characteristics of the child and his family.

Program analysis for educational programming is going forward in the educational community at district, state, and national levels. It is coming into more widespread use as the core of the PPB system's effort in the state, community, and nation. And analytical processes are being encouraged by the evaluation requirements imposed by the Congress and by the Department of Health, Education, and Welfare as a grant-in-aid condition.

Program Evaluation

Program evaluation is not new, but analytical evaluation that calls for rigorous formulation of objectives and measurements of the rate of progress to the achievement of the specific defined purpose is. The lack of rigorous evaluation in the past perhaps accounts for the many unknowns about (1) educational services, (2) production functions for educational outputs, and (3) measurements of the outputs themselves.

Program evaluation requirements have been written into important pieces of social legislation. National agencies are called upon to evaluate their programs, as are state and community recipients of federal funds. Evaluation efforts are being extended further by a series of institutional changes, including the beginning of the development of integrated systems of planning, programming, and budgeting in the states, cities, and counties, and the start made toward evaluation of Federal programs on behalf of the Congress by the General Accounting Office.

Evaluations have been carried out for the Head Start program, for the Job Corps, the Neighborhood Youth Centers program, and for Title I of the Elementary and Secondary Education Act. Perhaps the most important of these evaluation efforts for the impact it has had on analysis of educational programs is that carried out under the Title I program and financed as appropriate charges to Title I project budgets.

It may be useful here to summarize briefly the steps in evaluation of educational outcomes as set forth in Department of Health, Education, and Welfare regulations:

1. Defining objectives
2. Formulating criteria of measurement of objectives or describers
3. Finding examples of measurements
4. Establishing some standard or norm for those measurements
5. Applying evaluation methods
6. Analyzing the evaluation data collection
7. Deriving findings on the basis of the analysis

Possibilities of so structuring evaluation of demonstration projects that, out of the findings on separate Title I programs, experimental findings could be derived, were advanced by Rivlin and Wholey. Application of research models to evaluate studies can provide urgently needed data for major economic policies. Experimentation with negative income taxes that is addressed to the impact of family assistance and similar programs on work incentives is a case in point. More recently, the Office of Economic Opportunity has sought to gain experimentation with a voucher system that would give parents a choice in selecting school programs for their children.

Experimentation in the past has been very restricted in scope. Proposals now are being formally advanced by the governmental agencies for the design of experimental schools and experimental school programs that would provide detailed information on the changes in achievements and the costs involved in gaining the change. In 1970, the President called for the establishment of an Institute on Educational Research, and, by the programs endorsed, the administration emphasized performance assessments.

Evaluation as usually conceived is a concluding step in a process of decision making. Having analyzed program or activity, and taken a decision, there follows the step of evaluation to determine with what degree of success the purposes of the program have been achieved. Federal evaluation studies have begun to yield findings. The evaluations of Head Start have produced negative findings, and so did those of the Job Corps.

Such evaluation as has been carried out on Title I of the Elementary and Secondary Education Act is far from conclusive. In general, although some pupils are being helped, the pupil performance is not improving on the average; and where there are favorable results, it is difficult to specify what makes the difference.

Evaluation studies are importantly setting a policy direction in education. This policy thrust may be observed despite the paucity of critical analysis of the proper place of evaluation, and an even greater dearth of methodological discussion of the kinds of research design most conducive to productive evaluation studies.

While program evaluation is essentially designed as part of administrative and legislative decision making, only in a few cases has the evaluation result been fed into the process of program analysis by introducing that important link between evaluation and criteria specification, a search for alternatives, or the use of study findings in the analysis of cost or effectiveness of the several program options.

The design of the Follow Through program is perhaps the outstanding example of a program generated by the closing of the feedback loop from evaluation to program analysis. Evaluation of Head Start appeared to indicate that early gains in educational achievement were wiped out in subsequent grades with little if any performance results derived from the pre-primary educational efforts on behalf of the educationally disadvantaged child. Out of these findings came the option of educational supplementation through an additional, or follow-up, period. The program was in fact adopted as proposed on an experimental or demonstration basis to determine after evaluation whether the Follow Through program would enlarge the educational achievement of the disadvantaged child. Given the underinvestment in research and experimentation in education and other related social fields, it is not surprising that the conclusions of even the initial evaluation studies have had such a major policy impact.

The Current Crisis in the School System.

Contributing to a crisis of confidence are the statements derived from the initial educational evaluation studies made. The major study of course is the Coleman Report. In the translation, qualifications are omitted, cautions disregarded, and as the word is passed, findings become simple. Positive measures that could be applied "other than the additional study" are not often produced as options. The Follow Through illustration mentioned above is an important exception. Evaluation is useful as an integral part of the government and program process and needs to be closely tied to a search for and study of options on the one hand, and to analysis of relative costs and effectiveness of those options on the other.

PPB Systems.

Educational program analysis is being fostered as an integral part of program-planning-budgeting systems, quite apart from the requirements for program evaluation. A PPB system is fundamentally designed to link program planning, via analysis of potential program effectiveness, to budget decisions and thus to underscore the fact that by the budget decisions made in the community, state, or nation, program allocations are determined. The system sets a foundation for analysis and seeks to draw on those analyses as a routine of governmental program management processes. Unless there is reason for applying the results of an analytical study, it is not clear that study findings will become part of governmental decision-making.

Structural facets of the PPB system have sometimes been confused with the whole. These structural aspects, however, while important to assuring that there is an ongoing process for better analysis of programs, have limited meaning apart from the presentation of additional materials for public review. At least in one city that put its emphasis on analysis, the reason for this was the conviction that a massive effort to classify expenditures by program categories on a government-wide basis would suffocate the basic concept of PPB as a means toward rational choice among program options.

Structural aspects are essentially of two types. The first is the design of a program structure that sets forth the purposes of the governmental unit with taxing and spending powers and seeks to group the expenditures in terms of those purposes into a program budget type of format. The second structural aspect is the multi-year program and financial plan that sets forth the programs classified by output-oriented options for a period of years ahead both in terms of expenditures and output changes. This second document represents the basis for advance fiscal planning and the analysis of revenue requirements in relation to the changing projected expenditures.

The structuring of programs in a program budget format essentially involves two somewhat different approaches. One approach calls for a formulation of purposes in a hierarchal pattern starting with the question: Toward what goals or objectives are we working in this community?

The second approach starts with the ongoing activities and functions, asking in each case: Why, that is, with what purposes or objectives, is this ongoing activity or program being carried out?

Educational program structures of a variety of types have been designed. Some structures depend upon the organizational pattern of the schools with major categories identified as preprimary, primary, secondary, and vocational education. A second type of classification has essentially centered on curricula, or what was being learned in the school. One illustration of this is the National Education Association pamphlet that with some amendment might be interpreted to read: Learning of basic skills, learning about oneself and one's personal dignity, and learning about society and one's role in that society. Still another pattern of classification that has been adopted is that based on age or target group. No one method of structuring is clearly superior to another for all purposes, nor is there reason to assume that only one pattern of classification need be the exclusive pattern.

A better understanding of program and its consequences for a period ahead becomes all the more urgent as the budget for education grows. The size of the outlays that essentially predominate in the expenditures of the states and the communities, accounting overall for about half of local outlays and about one-third of the state and local expenditure totals contributes to the growing concern that the educational dollar be well spent. The hard questioning about educational activities and programs grows even harder in the light of the evaluations carried out.

A number of governments have begun the process of implementing PPB systems for all governmental functions within the jurisdiction. And in some instances, program budgeting has been applied to education. The major experimental effort in this area is that jointly being conducted by the Dade County, Florida, school system along with the National Association of School Business Officials. Financed by the U. S. Office of Education, a demonstration effort is underway that should throw important light on the uses of program analysis for local school decisions.

The Dade County school system effort is moving forward, but along with this school district activity are also steps toward PPB implementation in a number of school districts, including Milford, New Hampshire; Spring Valley, New York; Pearl River, New York; Danbury, Connecticut; Skokie, Illinois; Clark County, Nevada; Montgomery County, Maryland; Fairfield County, Connecticut; and Darien, Connecticut. Also included are several of the school districts in California, importantly, Los Angeles, San Diego, Berkeley, El Monte, Torrance, Hillsboro, San Mateo, and San Jose. In several cities, citywide efforts are ongoing in which education is a part. Among these cities are New York City, Philadelphia, St. Louis, and Seattle.

Work on program analysis in the states not only is being furthered by the efforts on the statewide basis toward integrated systems of planning-programming-budgeting, but also by the special demonstration of educational information sponsored by the U. S. Office of Education in its 20-state program.

FOOTNOTES

1. The neglect here of the utility derived from schooling during the school years is easier to assert than defend since approximately 20 percent of individuals' years of life is spent in educational institutions. Nonetheless, it is a neglect indulged in by most discussants of the educational scene who regard schooling primarily as "preparation."

2. Many of which may not be attributable to his school experience.

3. It may be objected that personal services programs which are aimed primarily at redistributive goals are not suited to treatment within a framework aimed at individualistic objectives. But redistribution, too, is an objective which has been considered in the market-analog perspective.

4. This line of reasoning applies to the discussion of short-range objectives that follows, as well as any analysis of "consumer sovereignty" in the provision of goods and services to the nonbuying young.

5. Such knowledge, it is apparent in 1970, would not eliminate the need for value judgments in defining and choosing among alternative long-run objectives. Is good citizenship defined as "active participation in affecting political outcomes," or as "high voting participation," or "staying out of legal trouble"?

6. Warren G. Bennis, *Changing Organizations; Essays on the Development and Evolution of Human Organization* (New York: McGraw-Hill, 1966).

7. After completion of this chapter, we reviewed the papers prepared for the 1970 Operations Research Society of America National Meeting and found that the problem of parental involvement had been presented on April 22, 1970, by Dennis J. Dugan of the University of Notre Dame, under the title of "Hidden Costs of Education: What Should Public Policy Be?"

8. State-Local Finances Project of George Washington University (Selma J. Mushkin, Director), for the Commitee on Educational Finance of the National Education Association, "Planning for Educational Development in a Planning, Programming, Budgeting System," 1968.

9. Much current educational research indicates that this may not reflect irrational consumption, though it surely will not be much help, under a

voucher system, in choosing among the many available schools which are likely to have similar clientele.

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